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THE New York *Tribune* has a story, which appears, from internal evidence, to have some foundation in fact, although the details have a Munchausenish flavor. It seems that about a month ago, four Californians set out from Yuma, on an exploring expedition into the Colorado Desert. They travelled for several days in the direction of the northern spurs of the Cocopah Mountains, until they came to a broken country, with rocks of granite and porphyry. Thinking that this might be a favorable region in which to look for gold, they set up a camp near a "water-hole," and began a systematic exploration. In the course of this process, one of them discovered, through a glass, some curious-looking stones projecting above the sand, far out in the desert. On further investigation, these stones proved to be carved granite columns, about eighteen feet in height, supporting granite lintels, and forming a quadrangle four hundred and sixty by two hundred and sixty feet. On the eastern side of the quadrangle were two stones "slightly curved, in a modified form of the letter S." These columns had for capitals "excellent representations of serpents' heads." Supposing that the entrance to the quadrangle might have been here, the gold-hunters dug away the sand which covered the lower part of the columns until they reached the base. Thus exposed, the stones proved to be carved in the semblance of "huge rattlesnakes, standing on their tails." The idea of a rattlesnake standing on the end of its tail, and supporting a "curiously carved capstone" on its head, is one which we commend both to naturalists and sculptors, as being quite novel. It is hardly necessary to say that this discovery encouraged the explorers to continue their researches, but beyond some more blocks of "cut granite," and some specimens of "unique pottery," they were unable to bring to light anything of interest. However, assistance has now been procured from capitalists in Yuma and San Diego, and as soon as the weather permits the investigation will be resumed.

THE Philadelphia Art Club will hold its third annual exhibition of architectural and decorative drawings in October next, the exhibition opening on the sixteenth of the month, and closing November 4. As before, drawings, either geometrical or perspective, for buildings, furniture or decoration, photographs of executed work, cartoons for stained-glass, and models will be admitted, and the Medal of the Art Club will be awarded to the most meritorious drawing, taking into account both design and rendering. Works are collected and returned in Philadelphia and New York, free of charge to exhibitors, but contributors in other places must provide for delivery at the exhibition-rooms. Entries of works must be made before September 26. Further particulars, with blank entries, and labels for works to be sent, may be had by applying to Mr. W. A. Porter, Secretary Exhibition-Committee, at the Art Club, Philadelphia.

M. HENRI RAVON, for the jurisprudence committee of *La Construction Moderne*, has something to say about the practice of requiring architects to guarantee that the expense of a given building shall not exceed the estimates. This idea, the credit of which appears to belong to the town officials of the Mississippi Valley, has, we are told, commended itself to certain French village authorities, and a correspondent, who had heard of such a proposition, asks the committee's opinion. M. Ravon, in reply, says that there is, in France, a marked tendency at present among public officials to treat the architect of a building as the general contractor for it, placing on him the responsibilities properly borne by the builder. This tendency, he thinks, is deplorable from every point of view, as well from that of the public interest as the interest of the architect. So far as the architect is concerned, the attempt, without adding anything to the very modest remuneration which he receives for his skill and trouble, and the responsibility, already heavy, which the law lays upon him, to impose upon him the burden of the inevitable risks of execution, he characterizes as "shameful," and says that it is "regrettable to see the public authority setting the example of notions so profoundly unjust."

BUT, from the point of view of the public interest, such attempts are more regrettable still. It is needless to say that no architect of character and skill would expose himself gratuitously to the risks which it is sought to fasten upon him in this way, and the inevitable result of the adoption of such requirements by municipal bodies will be to throw the designing and supervision of their building work into the hands of speculators, who are either openly or secretly in partnership with the contractors, and are sure to use their almost unlimited control over the work in such a way as to pay themselves liberally, though indirectly, for the risk imposed upon them. Nor, as M. Ravon says, can these speculators be blamed for doing so. By requiring architects to assume the responsibility of builders, they simply invite builders, instead of architects, to plan and supervise their work, and if the persons to whom their invitation is really addressed use their confidential relation as architects to put into their pockets, besides the comparatively insignificant architect's fee, a liberal builder's profit, the fault is less with them than with those who called them to this confidential relation, under conditions which made their interest directly opposite to those of the municipality which they were supposed to serve.

THE *Schweizerische Bauzeitung* describes a new process for electric welding, which is of the greatest scientific interest, and promises to be also of immense practical use. It will be remembered that Professor Thomson's process for electric welding employs currents of great volume, but low intensity, by which the pieces of metal to be joined are heated much as they would be in a forge flame, and are then made to adhere together in the usual way. This process has been brought to a high pitch of perfection, so that railroad rails have been welded into a continuous line, and it will probably always be the most advantageous method for large work; but the new process seems to offer certain points of superiority for small operations. We suppose that it will always be known as the subaqueous process, from the fact that the metals to be operated upon are submerged in water; but it should not be forgotten that its invention is due to two Belgian engineers, MM. Lagrange and Hoho, who have developed it with the help of M. Edmond Julien, the Director of the Brussels Electric Company.

IT is known to every school-boy that if the two ends of a wire are dipped in water, and an electric current is sent through the wire, the water is decomposed, hydrogen, if the current is strong enough, being disengaged in bubbles at one end and oxygen being produced at the other, showing itself in bubbles if the wire is of gold or other metal not easily oxidized, or by the oxidation of the wire, if it is of iron. If the current is quite strong, the disengagement of hydrogen bubbles is so rapid at the cathode as to surround that end of the wire with a cushion of gas. As all gases are bad conductors of electricity, the passage of the current, when this occurs, is greatly checked, and, as any resistance to an electric current develops heat, the cushion of gas becomes very hot, and with it the end of the wire enclosed in it, and, if the current is sufficient, the metal soon melts. Even a platinum cathode can be readily melted in this way, and a carbon cathode is partially converted into amorphous carbon, a change which is known to require a temperature of more than 7,000° Fahrenheit. As the water surrounding the hot metal and its envelope of gas remains cold, the manipulations incident to the process are very easily carried on. In order to get energetic action at the cathode, with a comparatively small current, the anode is formed by a plate of metal. In practice, a piece of sheet lead is used, which is attached to the positive pole of a circuit supplied with a strong current. The negative pole of the circuit is connected with a pair of small tongs, which are provided with an insulating handle. The anode is placed in a pail of water, rendered conducting by dissolving some potash or carbonate of soda in it, and sand is put in the bottom of the pail, to catch the particles of melted metal, and the apparatus is ready for use. If a piece of iron is to be operated upon, all that is necessary is to take it up in the tongs, and dip it in the pail. The water instantly foams around it, and in a moment it is glowing. A few minutes more, and it melts, throwing out a shower of sparks. If two pieces are to be joined, they are held together under water, and in a few seconds are at the welding temperature, when they immediately adhere. No scraping or filing of the surfaces to be joined is necessary, and they need not even be cleaned, the dirtiest pieces welding as well as the cleanest. This curious, and very convenient, feature of the process is due to the chemical action of the nascent hydrogen which is evolved at the surface of the metal, as soon as it is placed in the bath, and which reduces to the metallic state every particle of oxide that it can reach. In fact, the bath can be used for cleaning rusty iron, which, after being dipped for an instant into it, emerges pure and brilliant.

ANOTHER curious thing is that, probably on account of the complete absence of oxide, metals never before welded can easily be joined. Thus copper and brass are readily welded to iron, platinum and gold may be welded together, and platinum can be welded to many other metals, while pieces of hard cast-iron may be welded together. Where it is desirable, the same process may be used for tempering steel. As this, of course, does not require so high a temperature as welding, the current is interrupted, so that the metal is heated for an instant, and then cooled, the regulation of the interruption controlling the temperature. It is often necessary to temper or harden steel articles at particular parts, leaving the other portions softer and less brittle. This may be done to perfection by covering the parts to be left soft with a non-conductor, such as clay. The current then passes only through the exposed portions, heating them, to the exclusion of the others. The process is said to be far more economical than Professor Thomson's. To raise an iron bar three centimetres square to a white heat by the Thomson process requires, we are told, 36,000 ampères of current, while by the new process the same result is easily obtained with 100 ampères. Moreover, no special currents are required. The ordinary incandescent-light current of 220 volts answers perfectly, and even the 110-volt current sometimes used for lighting works very well. Alternating currents may be used, but they have the disadvantage of spattering the water about.

THE *Schweizerische Bauzeitung* gives an interesting account of the life of Daniel Colladon, the great Swiss professor and man of science. Colladon belonged to an old French Huguenot family, which emigrated from Berri in the sixteenth century, and settled in Geneva, where Daniel Colladon was born in 1804. He was educated at the College and Academy of his native city, and, by desire of his parents, took a course of law, and was admitted to the bar in 1824; but he inclined naturally to physical science, and spent his leisure hours, during his academic course, in experiments, in company with his inseparable friend, Charles Sturm. The skill and enthusiasm of the two boys attracted the attention of the professors in the Academy, who helped them in their work, and, later, introduced them to Ampère, Arago, Dumas, Fourièr and other great lights of science, whose assistance was of great value to them. In 1825, the French Academy of Sciences offered its grand prize in mathematics for the best essay on the measure of the compressibility of water. Colladon, who had already won distinction by researches in photometry and atmospheric electricity, determined to try, in connection with Sturm, for the new prize. The two friends began their work by investigating the rapidity of transmission of sound through water, taking stations on the Lake of Geneva, from ten to twenty miles apart. These determinations gave them a starting-point for their calculations of the compressibility of the liquid carrying the sound, and, after gathering such facts as they needed, they went to Paris, where they could consider their materials, and make further experiments with instruments not available in Geneva. In 1827, after the award had been once postponed, the grand prize of the Institute was awarded to the two friends from Geneva. The next year Colladon turned his attention to steamboats, which were just being introduced, and published a description of a method by which, as he thought, an advantage might be gained by feathering the paddles of side-wheel steamers. He mentioned several ways of accomplishing this result, and was awarded an honorable mention for his paper by the French Academy of Sciences; but, presenting his invention for the Montyon prize, the expert to which it was assigned for examination reported that the system was impracticable, as the movable paddles would be incapable of resisting the blows of the waves. The prize was, therefore, refused him, but the great steamship-builders of England and France, who also examined Colladon's invention, formed an opinion of it very different from that of the Institute's expert, and immediately adopted it; and, from that time to this, feathering paddles, on Colladon's system, have been used on all side-wheel steamers of the first class.

IN 1828, a banker of Paris gathered together a small company of professors and scientific men, and informed them of his intention to found a school for the education of engineers in the old Hôtel de Juigné. Dumas, Olivier, Peclet and Benoit agreed to help him, and the École Centrale, now perhaps the greatest engineering school in the world, was established. The founders called Colladon to act as professor of physics, and gave him later the chair of mechanics. His lectures attracted many students, and did much to build up and sustain the reputation of the school. Meanwhile, he continued his experiments, devoting himself particularly to the new science of steam-engineering, and, after several years at the École Centrale, took charge of a great establishment in Paris for the construction of steam-boilers and machinery. He built on the Rhone the first iron steamboat, fitting it with tubular boilers of his own invention, and various novel mechanical devices. In 1839, he was called back to Geneva to assume the professorship of theoretical and applied mechanics in the Academy. Here his countrymen found many ways of availing themselves of his ingenuity and skill. He was commissioned to prepare a plan for lighting the city of Geneva with gas, and for restoring the bridge of the Bergues, and was made a member of the Administrative Council of the city of Geneva and of the Representative Council of Switzerland. His greatest work, however, was the invention of the atmospheric rock-drilling apparatus first used in piercing the tunnel of Saint-Gothard. It will be remembered that the compressed air used for driving these famous machines was brought from compressors placed at a considerable distance, near a stream, which furnished water-power for operating them, and many experiments had to be made on the flow of compressed air through pipes before the machines could be designed successfully. Since then, it is needless to say, compressed-air machines have been used in all important tunnels, and Colladon himself introduced many improvements in them. These services alone would have entitled him to the admiration of his countrymen, as well as of scientific men everywhere, but, in addition to this, Colladon endeared himself to all who knew him by his modesty and public spirit, as well as by his kindness to young engineers, who never applied to him for advice in vain.

CITY GATES.[1] — II.

Fig. 12. Gate of Villeneuve-les-Avignon.

BUT it was under the feudal *régime* especially, when nearly every city was exposed to the inroads of numerous tribes of Barbarians, that the Roman gate was completely transformed. From the twelfth century, all thought of opening broad ways for traffic was abandoned; it was no longer the peasant, with his load of produce, who presented himself at the city entrance, but the enemy. How to contrive means of defence — above all, how to defend the gates — became the absorbing question. The weapons of attack were, it is true, of a rudimentary sort at this time; the besiegers were necessarily compelled to concentrate all their efforts against the weak and vulnerable points in the wall or the exits. The besieged, on the other hand, comprehending that here, largely, lay the danger to them, brought into requisition all the talent and ingenuity at their command to strengthen them as much as possible. About the twelfth century, therefore, the large Roman arches were converted into narrow openings having a sufficient height to give passage to a chariot. The people shut themselves up in their cities. The gate-towers were made exceedingly prominent and exclusively defensive [Porte Narbonnaise, at Carcassonne; gate of Laon, at Coucy]. The curtains were surmounted by battlements with machicolations. The entrance was closed by two portcullises, managed from a room over the passageway; sometimes, to guard against treachery, which was not uncommon at this time, as the soldiers were usually mercenaries recruited a little from everywhere, the windlasses by which the portcullises were worked were stationed in rooms isolated from each other and protected from all external intercourse.

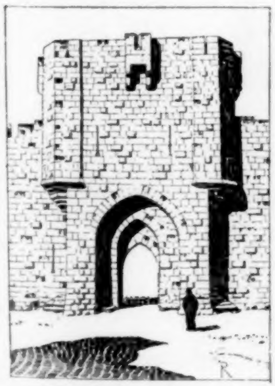


Fig. 13. Gate of Aigues-Mortes.

Lastly, obstructive works were multiplied on the exterior, and assumed great importance. The gate of Laon, at Coucy-le Château [See "Château," Figs. 2, 3, 4], built about the beginning of the thirteenth century, is one of the finest of this period. It is made of limestone from Aisne, with very thick joints.

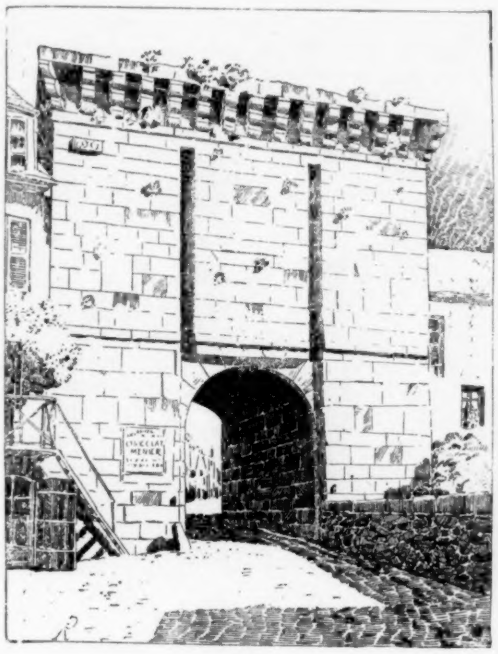


Fig. 14. Gate of Dinan.

We cannot, unfortunately, go into minute details here in describing this gate or any of those to be noted hereafter. A volume would not suffice for the discussion of the ingenious contrivances invented by the builders of the time. Everything was new, and the military architects were called upon to solve a most complex problem; their conceptions took shape in a composition of strange and terrible aspect, imposing and grandiose, resembling though not copying the primitive Roman

Fig. 15. Gate of Sens, at Villeneuve-sur-Yonne.

[1] From the French of G. Redon, in Planat's *Encyclopédie de l'Architecture et de la Construction*. Continued from No. 920, page 97.

type. The sections are curious and beautiful; the plans are the expression of powerfully stated demands; the façades present a *silhouette* of formidable aspect, and the rough style of construction, in small material with very thick joints of mortar, intensifies the impressive effect of the contours and lines.

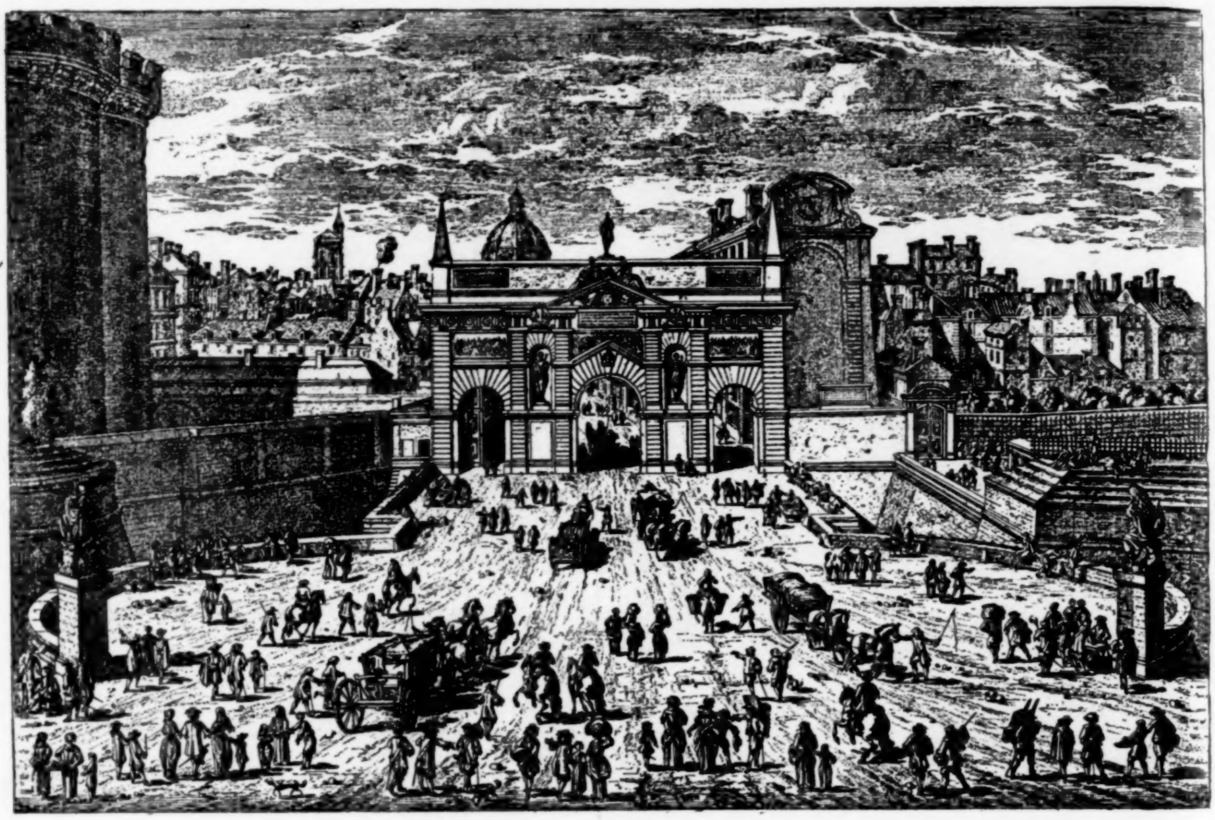


Fig. 16. Porte Saint-Antoine, Paris: after Pérelle.

Down to the close of the thirteenth century, the means of resistance seem to have been superior to those of attack, and to have been able to defy them, but, from the beginning of the fourteenth, the besiegers found themselves in possession of more effective and more perfect engines, and this led to a material modification of the character of city gates; their protection became of less moment, while, on the other hand, the external defence was better conceived and greatly developed. Bastilles appeared. The gate was looked upon as the last work to be carried; as the defensive operations were largely confined to the outer fortifications, the opening in the gate was enlarged, to enable troops to pass freely [gates of Villeneuve-les-Avignon, Guérande, Chartres, Villeneuve-sur-Yonne, etc.].

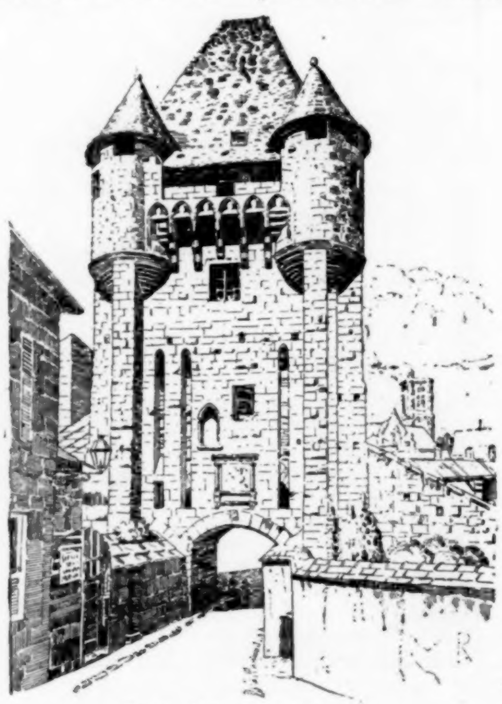


Fig. 17. Gate of Croux, Nevers.

The gate of Villeneuve-les-Avignon, erected by Philippe le Bel in the latter part of the thirteenth century (Fig. 12), is an excellent example of the gates of this period. As in the gate of Laon, at Coucy, the style is monumental and imposing. The crowning produces a very striking effect. In the centre may still be seen the remains of a square châtelet over the platform, which commanded the approaches to the entrance. This beautiful structure is of Villeneuve stone.

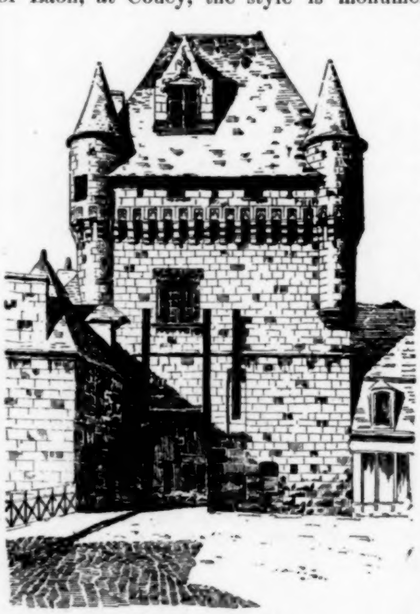


Fig. 18. Gate of Loches.

From the same period dates also a type of gates with one exit pierced in a square tower, which was neither flanked by towers nor guarded by watch-towers; for example, the gates of Aigues-Mortes (Fig. 13), Carpentras and Dinan (Fig. 14).

The exceedingly original gate of Villeneuve-sur-Yonne (Fig. 15) likewise belongs to the early part of the fourteenth century. It is most ingeniously disposed, with two huge oblique machicolations, which protected the drawbridge, and through which its chains undoubtedly passed. It is built of rough limestone, with hewn stones at the angles.

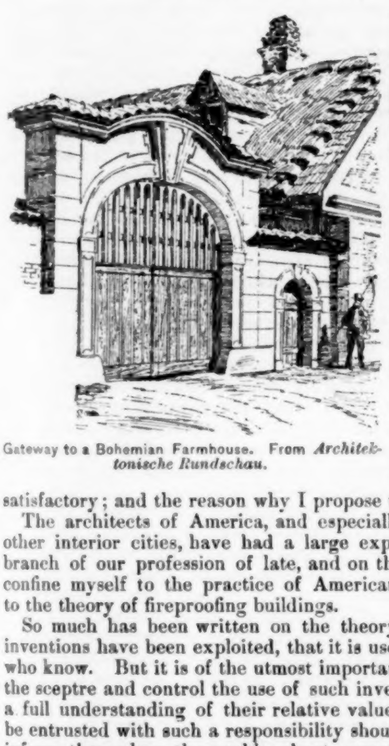
The famous Porte Saint-Antoine (Fig. 16) dates from the close of the fourteenth century. It had formed a part of the Paris fortifications known as the enceinte of Charles V. It existed in its original form until the end of the sixteenth century. It was adorned with statues when Louis XIV made his solemn entry into Paris in 1660. A triumphal arch had been erected in front of it on the occasion of the return of Henry III from Poland, September 14, 1573. The arch itself was decorated in honor of Louis XIV, and the architect, Blondel, was afterward commissioned to restore it. The restoration was not completed until 1672, and it was demolished in 1778.

The gate of Croux, at Nevers (Fig. 17), belongs to the fifteenth century. It is an interesting specimen of gates with watch-towers, but without ordinary towers. One can still see the two large grooves for the drawbridge and that of the postern. The entrance could be defended from the machicolations with stone consoles in the centre and from the watch-towers.

We give, also, a sketch of the beautiful gate of Loches, a variant of the preceding type (Fig. 18).

[To be continued.]

FIREPROOF CONSTRUCTION AND THE PRACTICE OF AMERICAN ARCHITECTS.[1]



Gateway to a Bohemian Farmhouse. From *Architektonische Rundschau.*

IT would be futile in the short space of time allotted for the papers to be read before this Congress, to give a treatise on fireproof construction. I will not assume that you are not well versed in the subject both by study and experience. You may have studied it faithfully from such sources as are attainable and many of you may have theories of your own which you have put into practice as occasions have offered. Your experience has in some cases been satisfactory to yourselves, but in many cases unsatisfactory; and the reason why I propose to suggest.

The architects of America, and especially those of Chicago and other interior cities, have had a large experience in this *practical* branch of our profession of late, and on that account I propose to confine myself to the practice of American architects rather than to the theory of fireproofing buildings.

So much has been written on the theory, so many new and old inventions have been exploited, that it is useless to reiterate to those who know. But it is of the utmost importance that those who wield the sceptre and control the use of such inventions should do so with a full understanding of their relative values. Architects who may be entrusted with such a responsibility should lose no opportunity to inform themselves thoroughly about everything pertaining to this subject. There are often valuable inventions which fail to meet approval because presented in an impracticable way, the authors of which claim for them more than they deserve, and thus disgust you with their reiterations; and frequently inventions which on the slightest investigation will prove to be not only useless, impracticable and expensive (notwithstanding protestations to the contrary) are presented for your consideration with a flourish of trumpets and a display of credentials and testimonials calculated for the time to prevent any attempt at investigation. Between these two kinds you should weed out the grain from the chaff.

Every invention that is good and successful will soon encounter a rival which makes claim to being superior and less expensive. These two claims are generally inconsistent. The most common errors of American architects have been in the direction of encouraging what are vulgarly known as "cheap and nasty" inventions. But notwithstanding this the great progress and development of the art of fireproof construction during the past ten years or more has kept pace with the development of the higher — that is, the artistic — education of the profession. And while I have nothing but praise for what has been accomplished, I cannot bestow it without reminding our American brethren that they have not been without their shortcomings, and that they have only been through a period of preliminary practice. They have done much that should be avoided and discarded in the future, and omitted much that there is no excuse for omitting, except inattention and indifference to the essentials of complete fire-protection.

The art of architecture in America has been raised to such a high plane, that nothing should be omitted to make structures that are worthy to be seen for all time, sufficiently durable to last for all time. The fireproof building in which wood is discarded for all constructive purposes can still be attacked by the ravages of fire. It is fully as important that it should resist fire as that its foundation should resist settlement, its piers refuse to be crushed or its floors to sag.

It is assumed that we are all now agreed as to the essential elements of a fireproof structure. I think it was in 1871 that I first suggested what these should be from the architect's standpoint in an address before the American Institute of Architects. These are: that all constructive materials should be incombustible, that iron and steel should be protected from such a degree of heat as would weaken them, and that combustible material not used for construction should be discarded as much as possible. None of these requirements are inconsistent with good architecture, and the same conditions exist as before. I may be repeating what I have said on other occasions when I say that the main faults of omission of modern architects arise from an inability to realize the intensity of heat in burning buildings, and the manner in which fire spreads. Whatever I may know on the subject, I ascribe to an early habit of running to fires and a fondness for groping around ruins, before I ever thought that this would be part of my own education. The professional fireman is fully aware of these things, but he is always a bad critic of fireproof construction, because of his want of education in the technical matters that pertain to it. For whenever a building supposed to be fireproof is injured by fire he condemns it *in toto* because he is not well enough informed to see the weak point in its construction or arrangement. He treats all buildings alike and naturally regards them all as food for flames, because all that he has any experience with have some radical defect that he does not see. But when he condemns them in detail you should listen to him. He is not, however, the man to suggest the remedy, that is for you to do. Scientific investigation on practical lines will lead you to it.

Before 1870, iron in all its forms was considered by architects to be a fireproof material. Buildings erected before that time were called fireproof if the vertical supports and floor-beams were of unprotected iron, the floors built of brick, and the roofs of wood supported on iron trusses, all other parts being combustible as before. In some, cast-iron joinery was substituted for wooden joinery at great expense, but still the constructive iron was unprotected. A large number of such buildings were erected in the seaboard cities, and nearly all public buildings received similar treatment. One of the most important Government buildings, namely, the State, War and Navy Building, at Washington, which was nearly twenty years in course of construction, was built in this way, right through a period when great improvements were being introduced elsewhere.

From 1870 to 1880 an improvement was seen in fireproof interior construction in only a very few of the many so-called fireproof buildings then erected. The greatest advance was made from 1880 to 1890, and it was during this period that the interior of the country — commonly called the West — took the lead. This is the period to which I intend mainly to refer.

Before 1871 there were few occasions of disastrous fires to prove the inefficacy of the insufficient means that had been taken to render buildings fireproof by simply substituting iron for wood. I remember only two in this country — one was a building owned by the Singer Sewing-Machine Company on the east side of New York, that was leased for various manufacturing purposes, and the other was the Fulton Bank Building in the same city, both of which were totally destroyed by fire. Besides these there were two in England, one being part of a storage-warehouse in London and the other a mill at Oldham, the destruction of which was described by the late R. G. Hatfield at one of the Institute meetings. But in the great Chicago fire of 1871 all similar buildings that were in any way attacked by fire, went down before it. It was this that awakened a general interest in the subject.

Before this time there were no experts in fireproofing. All of such works were done by builders, and the architects made their own specifications. But the Patent Offices of England and France had on their records many valuable inventions of fireproof construction, unused except to a slight extent and mostly for experiment in those countries, and not at all in our own. The late George H. Johnson was the first to patent fireproofing inventions of any value in this country, but he never reaped the reward of his ingenuity. He came to Chicago in 1872 and constructed the interiors of several buildings with hollow fire-clay tiles. But it was not a successful business with him, and he died before his system came into general use, to be succeeded by his son, E. V. Johnson. About the same time Leonard H. Beckwith, a New Yorker, who had been educated as a civil engineer in France, came from that country and organized a company in New York to introduce the French system of interior fireproof construction. The materials he used were hollow blocks of plaster and cinders, the plaster being reinforced with a small amount of French cement that had an affinity for plaster-of-Paris. His system was an improvement on that used in France. Mr. Beckwith advocated the covering of iron constructions

[1] A paper by P. B. Wight, Consulting Architect, read before the International Congress of Architects, Chicago, August 4, 1893.

with his material, but obtained very little encouragement in this from the Eastern architects. He was the first practical expert in fireproofing in America who put his inventions into extensive use. He procured a license from Johnson to use his patents, and it was not until he substituted burned-clay hollow blocks for the plaster blocks that he did any work that was successful and permanent. Mr. Beckwith made his own specifications, which were acceptable to the Eastern architects, and carried out his own contracts. The business was profitable until other manufacturers began to imitate his material and put it on the market to the general contractors. This continued for a while until without wisdom or forethought his company offered material for sale in competition with that of its competitors. Had he not done this there were enough sensible architects who would have thrown their influence in favor of work done by an expert. But from that time the architects ceased to consider him as an expert, he became only a material-dealer, and in a few years the company failed. From that time New York has never had a fireproofing expert, and consequently but few improvements were made in the East until the architects began to copy methods employed in the interior, and those which were used by Chicago specialists and contractors in New York.

The rebuilding of Chicago after the great fire was hurried work. The terrible destruction that had been wrought discouraged those who might have attempted to rebuild in a fireproof way; that and the necessity for rebuilding quickly gave reason for abandoning fireproofing. But another valuable result followed. As they had confidence in bricks, new party-walls were generally built much heavier than before. In consequence, fires in the business structures of Chicago have rarely extended beyond those in which they originated. The *Tribune* Building and the First National Bank were rebuilt as they were before the fire. The Kendall Building, afterwards called the Equitable Life Building, was the only one in which any improvement was made, and was fireproofed on Mr. Johnson's system, so that from 1871 to 1880, this and the new Court-house and City-hall were the only fireproof structures erected.

We now come to the period between 1880 and 1890, distinguished alike for the advance in æsthetic culture and scientific construction. For this the greatest credit is due to our home architects, for it was not until scientific experts had demonstrated the value of inventions long unused, and added to the list others that were much needed, that capitalists began to appreciate the fact that buildings really fireproof could be erected. The perfection of the manufacture of ornamental terra-cotta gave also a material for exterior use that could be called reasonably fireproof. Until then investors had been unwilling to put money into exterior ornamentation that was so easily destructible through the burning of a neighboring building. I know of no one to whom I would give more credit for an intelligent appreciation of the advantages of really fireproof structures than Owen F. Aldis, of Chicago, who then, and until now has, directed the investments of the Brooks family, of Boston, amounting to several millions of dollars, in buildings in the City of Chicago. In this he has been ably assisted by the architects whom he first employed, Daniel H. Burnham and his late partner, John W. Root. The example they have set has been followed by all the leading architects of Chicago and other interior cities, notably by those of Cincinnati, St. Paul and Minneapolis, and later by those of Pittsburgh and St. Louis. This fireproofing system is based on the use of one, and only one, material, namely, hollow fire-clay blocks for all interior and roof constructions, and the protection of iron and steel. These blocks are made either of dense or porous material, but always of clay, and the best of them of fire-clay. I reject everything but clay for fireproof structures. To assume that a material is incombustible does not prove that it is fireproof. Clay is the most plentiful material on the face of the earth, and so cheap that it is not necessary to look for anything cheaper. A great advantage that it has over concrete made of hard cements, so much used in Europe, is that it can be made so much lighter, while I do not think a comparison is admissible with all the various compounds of which calcined gypsum or common plaster-of-Paris is the main ingredient. Therefore, in speaking of fireproof buildings, I will refer only to those in which clay or fire-clay is the material for interior construction and terra-cotta for exterior adornment, with walls of brick or steel construction enclosed with brick.

The use of steel foundations, and later of steel-framed constructions, are the natural outcome of the use of light hollow fireproof blocks. In order to build fireproof structures and make them pay, they must be many stories higher, so as to decrease the relative cost of the land to the improvement. Building higher on compressible soils necessitated economy in weights. Hollow materials *only* made this feasible. It was then found that the heights of buildings could be increased more and more by using steel frames, but only in case those frames were protected by the light fireproof material. Hence the latest and most improved buildings contain very few bricks, the exteriors being of cellular terra-cotta, and the interior faces of the exterior walls of hollow fire-clay blocks.

The number of these structures and the extent to which this system has been used is well known to all of you, and therefore I need not particularize the great number of buildings thus erected; and while you who are of this country have certainly done your part in them, you may well ask now: "How did this all come about?" I will answer that, at first, it was by the employment of contractors who were experts. You will generally admit the importance of departmental work in architectural practice, but it has not been customary to employ experts in fireproofing when the contractors were experts. What, then, have you to do if the contractors are not experts? If you trust yourselves to their advice, you will simply subserve their interests, and not those of your clients. The only solution is that you must become experts yourselves or employ those who are.

In this review of American architectural practice in the department of fireproof construction, I am obliged to record my observation that the last decade has not always been marked by progress, and, unless you become as well versed in the details of everything that pertains to this subject as the expert contractors, you may fall into serious errors.

In my own experience as a contractor for fireproofing, which terminated two years ago, I have read hundreds of specifications for fireproof work, in but few of which what was needed was clearly expressed. You were obliged to trust to the contractor for what you wanted, and that was all very well as long as your contractor was an expert in the art, and received a price which he considered fair and remunerative. But when he was not an expert you had trouble. The demand for competition brought those into the business who were not experts in the use of fireproof materials, but simply had facilities for making them.

Fire-protection is a scientific study which requires not only a knowledge of the cause and effects of fire, but a thorough knowledge of all the systems and details of building-construction and a keen eye for the dangerous adjuncts that are constantly creeping into modern systems of building. Among the latter are the extensive use of piping of all kinds, which, unless skilfully managed as part of the original plan of the structure, may not only become the means of great disfigurement, but weaken the construction of those parts which are of fireproof material and open up avenues for extending a conflagration. The fireproof materials are required for three principal uses: First, for the construction of floors, of which there are many methods; second, for the building of walls and partitions, and, third, for the protection of isolated constructive members. The man who is most competent to build a fireproof floor is he who is equally versed in the properties of steel and burned clay, and has had experience with both. He who can best plan and describe walls and partitions must have full knowledge of their statical conditions, bearing-strength and lateral stiffness, and must know all the devices for keeping them in place and securing doors and windows to them in the best manner. He who can correctly specify the proper method for protecting steel or iron columns, girders and trussed constructions must have a large range of experience in all the methods that have ever been used, and the best shapes for the purpose that are practicable to be manufactured. The worst blunders of contractors have been in this department, and badly-planned, careless and indifferent work, when put to such a test as was recently given in the building of the Chicago Athletic Club, is calculated to bring discredit not only upon contractors, but architects as well, and to shake the confidence of the community in the whole system of fireproof construction.

The attention now given to steel constructions, if given to these matters, would soon result in very scientific work being done, so that, when it is put to a test by actual experience, we would have no more of the croakings and speculations of amateur critics and reformers.

The proper fireproofing of a building is not alone a matter of the selection of materials. It enters into nearly every feature of the plan. A building may be reasonably secure against accidental fire or the extension of a fire once started even if no special fireproof materials enter into its construction. This result is attained by cutting off communications as far as possible, being those unseen as well as those visible. The former are the numerous pipe and air passages, always so difficult to manage, and the latter the stairways and elevators.

Many years ago the Harper Publishing House in New York was erected when fireproofing was in its infancy, but it did not contain a stairway or elevator, these being placed in towers in the court. A similar result has more recently been obtained in a building in New York for the American Bank-Note Engraving Company. This is practically two buildings fronting on two streets. Two connecting parts contain all the stairways, elevators and rising-pipes, thus leaving a square court in the centre. The connecting buildings are shut off by reliable doors from the main buildings. This double system is essential to convenience and safety. We have a similarly-planned building in Chicago, namely, Gore's Hotel, but not quite so good as the Bank-Note Building, as it is not provided with cut-off doors. Buildings planned thus are not in need of exterior fire-escapes. The two last mentioned are not built with steel floor-beams, but both are thoroughly protected. The words "slow burning" are not applicable to them, but refer only to buildings constructed with heavy floor-beams and thick plank floors, and not considered in this paper as fireproof buildings in any sense. All three of the above-named buildings are good examples of arrangement for safety against fire.

Referring now to the class of buildings described as "partially fireproof," I desire to say in this connection that I do not recommend this system of building. It is only resorted to, to save the expense of using incombustible materials entirely. It is not always reliable and we have had experience to lead to this conclusion. This has shown that it is reliable only in some cases. One building, the Wilshire, in Cleveland, has been on fire twice and has been saved by it in both instances. The ceilings were made of porous terra-cotta blocks of the best manufacture, shape and method of application, all the blocks being secured with screws and countersunk plates of iron. The large store-building, corner of Wabash Avenue and Adams Street, Chicago, now occupied by Revell, was saved from a very severe fire in the upper story. It is of the same construction and material. The Lumber Exchange at Minneapolis was totally destroyed. The ceilings were all of porous terra-cotta, but bad in shape and method of application, the blocks being fastened with nails and tin washers, exposed. The *Tribune* Building in Minneapolis was totally destroyed. The ceilings were of thin fire-clay slabs of the best form and method of application, but for several years after it was built they had been tampered with in making alterations and putting in machinery, and parts of them had been removed. It is proper to say, however, that two previous fires had been easily extinguished in the same building, the confidence inspired by which led to serious loss of life when it was burned at last.

In a thoroughly fireproof building it is not alone necessary that the materials of construction shall be incombustible and covered with burned clay. (1) The clay used in the manufacture of the fireproofing material must be of a certain kind. (2) The forms of the pieces and the method of putting them together and securing them in place must be based on scientific principles, and the experience of those who have studied the subject.

The clay must be of the refractory kind, that is, it must be either a plastic fire-clay, a semi fire-clay, or a fire-clay mixed with a plastic clay or shale. The best fire-clays are too "short" for this purpose and too brittle if highly burned. In the manufacture of porous terra-cotta very few clays have been found that are both practicable for making a good article and reliable to resist fire when in use. So far as I know they have only been found in three places: Brazil, Indiana, Chaska, Minnesota, near Minneapolis and St. Paul, and some parts of Eastern New Jersey. For the manufacture of hard fire-clay material, proper clay can be found in many localities. The best that I know of are in Utica and Ottawa, Illinois, St. Louis, Missouri and the Eastern clay-belt of Ohio, where they exist in the greatest quantities. They are all white and buff clays — the buff clays being preferable on account of their toughness. No clay that burns red or salmon-color is fit for a fireproof building-material. Of this I am positive. The greatest errors of American architects have been in the acceptance of so-called fireproof materials made of inferior clays.

The form and method of assembling and securing the fireproof clay materials are the next essential considerations. They involve many principles of construction and provision against expansion, a description of which the limits of this paper will not admit. In securing the material to constructive steel and ironwork many mechanical expedients must be resorted to. The avoidance of these expedients rather than their too extensive use is to be sought. This can be obtained by forms of material that are to a certain extent interlocking, and a special study is often required in new cases constantly arising. I have often seen in specifications the requirements of mechanical expedients or fastenings, with iron straps and bolts where they might best be avoided, and too much of the same in practice. It is too often forgotten that it is useless to employ for fastenings the same material that we are trying to protect. As a general principle, where metallic fastenings or hangers are necessary, they should always be either concealed within the fire-clay or covered with mortar. All suspended fireproofing should be secured from the back or edges. As an illustration, the common form of roofing with ⊥ irons and book tiles is not a fireproof construction and will sag and fall from slight exposure to fire on the underside, though thoroughly fireproof on the upper surface. It should not be used unless protected by a suspended fireproof ceiling, all communication with the intervening space being permanently cut off. As a further illustration, all girder-covering supported by straps or bands on the outside is useless, and all wooden blocks built into fireproof material should be avoided.

This is but a slight sketch of the essentials of thorough fireproofing, such as have been complied with in some of the many fireproof structures that have been erected in America during the past twelve years. I will not attempt to describe these buildings, which it is also quite useless to enumerate, as there are so many of them, all differing in degrees of excellence. I only wish I were able to say that in our practice there had been a gradual progression from good to better. There is always room for improvement, and it is almost as injudicious to remain stationary as to take up with nostrums that are constantly parading to attract our attention. We have worked on good lines and accomplished good results, and notwithstanding that some of us have made mistakes there is no reason why we cannot avoid them in the future. I have endeavored to show that expert knowledge in this branch of your work has too often been unheeded, that experts have not been encouraged as they should be, and charlatans have, as they should not be. This is an error easy to correct, and the solution of it is that you should either become experts yourselves or employ those who are. The practice of architecture calls for expert knowledge of almost everything under the sun. None of us can possess it all and hence it has been the custom of offices having large practice to adopt a department system for the division of office-work. I think that where this is done the subject of fire-protection has been too often neglected. This is only a little fault of omission that can easily be corrected and I hope that I have been of service in calling your attention to it.

A REVIEW OF RECENT PLUMBING PRACTICE.[1]

Gateway to a Bohemian Farmhouse. From *Architektonische Rundschau.*

THE methods of planning and jointing pipe and setting fixtures in plumbing a house fifteen years ago are interesting, as showing the lack of intelligence, both of the designer and the workman, at that period. Terra-cotta pipes were used under buildings. The joints for branches were usually made by pecking a hole into the larger pipe and inserting the small one. No care was taken as to alignment of the whole. The spigot-ends of the pipe were inserted into the hubs carelessly as to contact, level or grade, and often without cement.

Old house-sewers of this date, when taken up, have been found invariably acting as conduits for and distributing filth through the joints into and contaminating the soil beneath the house.

Cast-iron pipe, when used, was then uncoated. For bends and branches there were few fittings, the ordinary method of branching being similar to that adopted with the terra-cotta, pecking a hole and sticking in the end of the small pipe, thus forming a projection on which foul matter could collect. The joint was covered with putty. Piping systems were never tested. The only tight joints made during this period were where lead soil-pipes were used with wiped joints, the work being done by some old English or Scotch plumber.

No system of pipe-trap or local ventilation was in use. The pan-closet, with its large concealed receptacle for filth, was used everywhere. All plumbing fixtures were concealed by woodwork, with numerous dark and inaccessible places, in which the germs for filth-diseases had a quiet and uninterrupted opportunity to breed. Fifteen years ago there was no literature on the subject, except a little in books on engineering or water-supply, and the only way in which an architect could inform himself was to get instruction from the most intelligent plumber of his acquaintance, or begin the study of the appliances and practice as he found them, and improve on such methods according to his common-sense, his mechanical or scientific ability.

One of the first efforts to call attention to this lack of knowledge was a series in the *Atlantic Monthly* by George E. Waring, Jr. The first articles, published in 1875 and continued in 1878, advised reform and advocated an open soil-pipe. Following this, in 1878, T. M. Clark wrote quite a practical series for the *American Architect* on "Modern Plumbing." By this it can be seen that the civil engineer and the architect instigated the reform. These articles, and articles in the *Sanitary Engineer* about the same date, were the first to advocate trap-ventilation, the *Sanitary Engineer* giving a section of a house with all traps vented. The literature on the subject since that time has increased, but there is still a decided need for a thorough work on this topic.

S. S. Hellyer, a prominent dealer in plumbers' supplies, a manufacturer and plumber in London, has written two practical books from the English standpoint — one in 1880, another in 1882 — in which the methods and advice given are good, but he gives simply an exposition of the English way of doing the thing.

P. J. Davies (1887), who is another English manufacturer and plumber, has put upon the market an elaborate work on plumbing as he thinks it should be done. This book is full of crudities, bad methods and poor advice as to appliances and arrangements, Mr. Davies being a man evidently full of his own wrong ideas and determined to enforce them.

W. P. Buchan (1876–1883), a Scotch plumber, gives in his book a short practical account of the English, or Scotch, methods in vogue, with little effort to make his book more than an elementary treatise.

The writers on the subject in England (with the exception of Latham and Denton, who devote to plumbing a portion of their works on sanitary engineering) have been tradesmen, not professional men, and the books lose for this reason, not having the breadth, scope or literary qualities that might be expected from a professional or scientific man. Hellyer's books are still the best exposition of the English practice, being confined practically to methods of lead-piping and descriptions of English appliances. The only modern French work on this subject is F. Liger's "*Fosses d'Aisance, Urinoirs et Vidanges.*" This gives a thorough description of the peculiar

[1] By Glenn Brown, F. A. I. A. Prepared for the Convention of the American Institute of Architects. Read by courtesy of the Institute at World's Congress of Architects at Chicago, August 4, 1893.

contrivance used at the time (1872) in France — a large sheet-metal pipe extending from closet to a large barrel or other movable receptacle. This portable cesspool, when full, is removed. The peculiar apparatus for separating fæcal matter from the urine, showing how the urine escapes in sewers, is shown, and how the barrels (*fosses mobiles*) are removed. The apparatus and disposal appear peculiarly antiquated, while the odors which arise from them must be intensely disagreeable. The arrangements described, I understand, are still largely in use in Paris. Other foreign literature on the subject is of little, if any, practicable value, except as a means of calling public attention to vital matters, and consists either of books or pamphlets by alarmists like Dr. Pridgden Teale ("*Dangers to Health*"), or by physicians who do not understand the practical side of the question, or by inventors or manufacturers who desire to push their wares.

In America, the writers are limited to George E. Waring, Jr., E. S. Philbrick, T. M. Clark, J. P. Putnam, W. P. Gerhard, J. C. Bayles and myself. The plumbers in this country have done nothing by way of adding literature to advance the trade, and in many instances they have opposed such advances.

The books published in this country do not give more than an elementary or partial treatment of the subject. The majority of them discuss it only from a sanitary standpoint. Mr. Clark's articles, already referred to, are simply a short series, covering the ground in only a general way. Philbrick, in his book, treats the subject only as an incident to American sanitary engineering. J. C. Bayles writes principally of hydraulics and water-supply, ignoring what we would call plumbing proper, although the title of his work would indicate a treatise on plumbing. Waring's and Putnam's books are largely descriptive of their own inventions, many of which have excellent points, but, in a treatise on the subject, should probably take less space than has been given them. W. P. Gerhard has written three small works on house-drainage which constitute the best American treatment. These books are small, and cover the ground only in an elementary way, and principally point out the availabilities from a sanitary standpoint. He practically avoids in his works the question of trap-ventilation. The book I have published describes simply the one subject in plumbing — water-closets — and the pamphlet that of trap-siphonage.

We have no book descriptive of American plumbing of the same thoroughness that the work of Hellyer gives to the English practice, and at present there is no book which gives more than a partial, local or very elementary discussion of the trade as practised in our own and other countries. Among the magazines the *Engineering Record*, of New York, formerly the *Sanitary Engineer*, deserves great credit for its determined and persistent advocacy of all real improvements in plumbing, and of the proper systems of piping and ventilation. The care with which all matters are sifted before they appear in this journal is to be much commended. Great credit should be given also to the *American Architect*, of Boston, which has published many articles in this line, and held its columns open for discussion.

Other magazines have used little judgment in the selection of articles; they have been either exaggerated for the purpose of an alarm, have been fulsome puffs of inventions or systems, or show a great lack of knowledge on the subject they have allowed in their columns. This agitation has produced a revolution in plumbing practice during the last ten years. The first and principal gain has been the adoption by the principal cities of plumbing-regulations. Although these regulations are not all good, and the best of them are not free from defects, still the worst of them require plumbing which is far in advance in arrangement and execution over the ordinary work in vogue fifteen years ago.

Washington claims to be the first city to adopt plumbing-regulations. These have been improved, from time to time, and last fall they received an extensive revision. Washington now requires all master-plumbers, before they can practise their trade, to pass an examination. This I consider a great advance and worthy to be adopted by cities that have not at present put such laws into execution, as it certifies to a plumber having at least a limited knowledge of his trade, and a capacity to do his work. The requirement of city inspectors and the testing of pipe systems by water and air are excellent points attained.

A recent improvement in terra-cotta pipes has been increased thickness, depth of hub and ribs in hub and spigot. In all good work in recent years light cast-iron pipe has been discarded, heavy iron being used in its place. Several companies are now testing their cast-iron pipe by hydraulic pressure before sending it out. This is a decided gain, as cast-iron pipe of the best make was liable to sand-holes and other defects, many of which were covered by the pitch or other coatings. Instead of the old method of cutting holes in pipes of either terra-cotta or iron, fittings are now furnished suitable for every contingency that may arise in ordinary practice.

One of the best modern improvements for house sewerage is the introduction of wrought-iron and steel pipe with screw fittings, by Mr. C. W. Durham. This gives a rigid piping system in no way depending on floors, which may rupture the joints in ordinary systems by settlement or shrinkage, and at the same time gives an opportunity for absolutely tight joints in pipes and connection with fixtures.

Data as to the life of pipes and effect of coatings in ordinary use have been accumulating slowly. Lead pipe is practically indestructible; many pieces are still in perfect condition that were in use in Rome, Pompeii and other cities two thousand years ago. Iron, which has come into such extensive use during the last few years, is subject to destruction by oxidation. How rapidly and under what conditions this occurs is a matter of importance. Fresh water oxidizes wrought-iron more quickly than it does cast-iron, while salt water seems to have an opposite effect.

The rate of wear on wrought-iron supports where subjected to action of air and water alternately is apparently one inch in twenty years, as proved by supports on lighthouses. Cast-iron pipe fails from accretions on the inside when used for water-supply, peculiar nodules filling the interior of the pipe. This trouble has been encountered in all the cities where cast-iron pipe was first used. This seems to be particularly the case with soft waters. As for soil-pipe, the slime which adheres to the interior seems to protect both cast and wrought iron, and the necessity is to guard the pipe from destruction on the exterior. Where the pipe is subjected to a constant change of conditions, *i. e.*, action of air and water alternately, it deteriorates rapidly. Pipes taken from the streets of Alexandria, Virginia, laid in gravelly and made grounds, buried in 1851, and taken up in 1885, were practically worthless, being soft and easily pulled apart with the hand, while pieces buried in clay soil were perfect. The city-engineer in Philadelphia informs me that he has found the same to be a fact in Philadelphia, and others have noted the same effects.

It seems needless to say that paint will protect the exterior if put on before oxidation begins (red lead forming the best first coat), otherwise oxidation will go on beneath the surface of paint. Pitching or asphalting seems to act as a preservative, although there is very little positive data showing how long such coating will protect the pipe. Iron pipe may be obtained dipped in metallic paint; this answers but a short time. Galvanizing is but a trifle more effective. Enamelled iron pipe, if the enamel surface can be kept intact (not an easy task), would form an ideal pipe for interior protection; but as soon as oxidation begins, the enamel chips, and the whole surface is rapidly fluxed off.

The Bower-Barff, or rustless-iron process (where it is not necessary to cut through the surface, or where it is treated after the pipes have been cut and fitted) seems to have answered its purpose well for both wrought and cast iron during the short time it has been in use; but its effectiveness is weakened by the necessity for cutting and fitting pipes while work is in progress.

As to the effect of pipes on health: Lead-pipe has been traditionally injurious to health from the time of Vitruvius, two thousand years ago, to the present day. In spite of this tradition millions of people have been drinking water passed through it from that day to the present time, and it seems to be doubtful if one well authenticated case of lead-poisoning by the use of lead pipe has been found.

Lead tanks subjected to the action of air and water alternately are undoubtedly injurious, but the opinion of all experts who have recently examined the question quite thoroughly in France, England and Germany is, that lead-pipe is not to be feared except in unusual circumstances, to which it is never subjected in actual use.

Paris uses it in thirty-nine thousand five hundred houses, Berlin, in twenty thousand; yet no case of poisoning could be discovered by a commission appointed to examine into the question. The British Institute of Civil Engineers makes a similar report. Ten million people daily drinking water through leaden pipes would probably be a very low estimate of the fact, and still hardly a case in a year is even attributed to lead-poisoning by this means.

As for ventilation of the pipe system: The fresh-air inlet and the soil-pipe opening above the roof are, I think, now approved by all who have given the subject consideration. I am sorry to say that trap-ventilation, *i. e.*, a vent-pipe from the crown of the trap, is a matter still in dispute.

I have space simply to touch upon this subject in such a running review as I have been requested to make. Experiments have been made by Lissauer in Germany, S. S. Hellyer in London, Philbrick and Bowditch in Boston, the Master-Plumbers' Association of Worcester and Glenn Brown of Washington. The conclusion is drawn by each of the above experimenters that trap-ventilation is the best method of preventing siphonage and back-pressure. Mr. George E. Waring, Jr., of Newport, and Mr. J. P. Putnam, of Boston, deduce from their experiments that trap-ventilation is a fallacy. The five experimenters first mentioned draw their deductions from the fact that it is practically impossible to siphon or force by back-pressure a properly vented trap, while all unventilated non-mechanical traps are liable under one contingency or another to siphonage and back-pressure.

Although the conclusions of Messrs. Putnam and Waring are the same, they are drawn from diametrically opposite standpoints. Mr. Waring concludes that vents are useless because traps will never siphon in ordinary contingencies. From his experiments Mr. Waring must admit that traps are better when protected with vents. Mr. Putnam concludes that vents are useless because vented traps under ordinary circumstances are never safe against siphonage. Messrs. Putnam and Rice, who conducted their experiments jointly, are the only experimenters of the seven who conclude that trap-ventilation is useless because of non-protection.

Dr. Lissauer, S. S. Hellyer, E. S. Philbrick and E. W. Bowditch, and the experiments at the Museum of Hygiene show the necessity and utility of trap-ventilation, both to protect the seal from back-pressure and from siphonage. All the contingencies that would be likely to occur in ordinary practice are covered by one or the other experimenters. Traps mechanical and non-mechanical of varying sizes being used, long and crooked vents of varying size and length being used by S. S. Hellyer and at the Museum of Hygiene. Small and large waste-pipes being used by S. S. Hellyer and E. S. Philbrick. The effect of siphonage by momentum being specially tested by E. S. Philbrick. The effect of discharges in stories above and below the traps being tested by all the experimenters.

From Mr. Waring's experiments I would draw the conclusion that ventilation is a necessity, although he draws the opposite conclusion therefrom. Traps unventilated were siphoned with soil-pipe open, while his vented traps in other positions were not siphoned even when the soil-pipe was closed.

The experiments of J. P. Putnam are the only ones which show failure by siphonage and back-pressure in almost every case with vented S-traps. Taking into consideration the results of the six other experimenters, the results shown in those of Mr. Putnam must be attributed to the unusual form of his apparatus, he having adopted unusual combinations. Mr. Putnam's experiments apparently show that the "Sanitas" and the larger "pot" traps resisted back-pressure. The reason for this was that his apparatus was arranged in the most favorable manner to prevent back-pressure, a straight soil-pipe with the minimum amount of friction and a fresh-air inlet open. Now in actual practice the soil-pipe often necessarily has offsets and bends and the fresh-air inlets in seventy-five per cent of actual cases (the small perforated covers) are closed or partially closed by dirt, when the maximum of back-pressure would be encountered, and when no trap in ordinary use would have sufficient water to counteract the pressure. Then, all the water in the trap is not necessarily driven in the pipe above the trap, but is forced back through it, usually in bubbles, the water passing up partially above the trap and falling back.

Even should Mr. Putnam's proposed method, *i. e.*, placing the trap at a sufficient distance below the fixture, prevent back-pressure, I do not see how it could in practice be applied to any fixture except wash-basins and sinks; we could not go sufficiently below the floor for bath-tubs. Mr. Putnam does not offer us a substitute for the S-trap in plain hopper-closets, slop-hoppers, etc., or object to the foul matter between the basin and trap. That trap-ventilation is necessary for large S-traps under hopper-closets, slop-hoppers, etc., I think even he would admit. The danger of sewer-air passing in bubbles by back-pressure has been questioned. Sewer-air is dangerous only in case disease-producing germs are in it and in this case bubbles passing through by back-pressure would be dangerous.

Prof. Raphael Pumpelly, in his experiments, covers this point of danger in bubbles passing through traps. I quote from the National Board of Health, *Bulletin* 13, the conclusion from the experiments given by Professor Pumpelly the following words: "At normal summer temperatures no germs were given off from the decomposing liquids whenever their surfaces remained unbroken, even though in some of the experiments the air was continuously conducted over them in a slow current. When the surfaces of the liquid were broken, however, by the bursting of bubbles, germs were invariably given off and sterilized infusions infected, no matter how slowly the aspiration was conducted."

Since the above experiments were made J. E. Denton made similar ones on ball-traps, tortuous-passage traps without vents, and on S-traps with vents, and with the McClellan vent: they prove only what has been already proved in previous experiments — that properly vented traps are better than others. The bulk of these experiments were with the McClellan inlet, showing it to be equal to a vent $13\frac{1}{2}'$ long of $1\frac{1}{4}''$ wrought-iron pipe with two elbows. In neither case does this protect against back-pressure. It proves that the $3''$ vertical vent should run parallel with the soil-pipe, the only thing that will prevent the severest siphonage and back-pressure.

The deductions to be drawn from the above facts are:

1. That unventilated traps are liable to fail from either or both siphonage and back-pressure.
2. That small traps should have vents the size of the trap, and the main vertical vent should be $3''$ in diameter in ordinary dwelling-houses, and should be computed for larger houses.
3. Ventilated traps do not fail by either back-pressure or siphonage.
4. That ventilation through pipes of the proper size should be required in all specifications.

There is one point which it seems proper to mention in connection with trap-vents, *i. e.*, the claim that they are stopped by accretions from the grease and other matters thrown into them by the water passing through the trap. I have made inquiries as to old traps taken out, and have never found vents stopped, with the exception of a few found in water-closet traps. Recently I had a vent opened in a $1\frac{1}{4}''$ S-trap under a sink in constant use by four or five families in a tenement, for kitchen and other slops, which, to my knowledge, had been in use constantly for between four and five years. The $1\frac{1}{4}''$ vent was attached directly at the crown of the trap by a wiped solder-joint in the common way, without being bell-shaped or enlarged. The use to which it had been subjected, the position and method of attaching the vent, made conditions the most favorable for stoppage. The vent was found entirely free from accretions; there was probably one-sixteenth of an inch of grease and slime on the sides of the trap and vent. The point of attachment and the vent were cleaner than the trap.

From this and other numerous inquiries I have made, I conclude that trap-vents are closed by such accretions only under peculiar conditions. Traps are now made to prevent such possible accretions. Trap-ventilation is important, not only on account of siphonage, but bceause the constant current of air passing through the trap hastens the division of decayed matter into its constituent gases.

The question of increased evaporation caused by trap-ventilation is one, I think, of little practical importance, as failure is never likely to occur from this cause except in unoccupied houses, and, in cases of this kind, either ventilated or unventilated traps should be specially looked after.

In the matter of methods of testing pipe-systems, the smoke and peppermint tests are of little service, as they do not represent any pressure. Filling the pipes with water or testing them with compressed air, the pressure showing on a gauge, are the only reliable methods.

Of apparent recent improvement in plumbing fixtures — I say "apparent" because many have not been in use long enough to give the guarantee which time alone can give, I will say only a few words. Several years ago, in the preparation of my work on water-closets, I stated that the only objection to the short-hopper closet was the small water-surface; but, even with this defect, I considered it the best form in the market. Quite recently, two manufacturers, Dalton & Ingersoll and J. L. Mott, have put upon the market a short-hopper closet with enlarged water-surface, which is a decided improvement. These forms, from their extreme simplicity, efficiency and cleanliness, still kept this class of closet in the lead. I consider the different forms of siphon-closet the next best. Quite an improvement has been made in the seats of closets by attaching the seat and lid to the bowl itself; in this way the seat is detached from the wall, and the space behind the closet is open to inspection. Cooper and Mott have introduced such seats.

The introduction of porcelain and earthenware sinks, laundry-tubs, slop-hoppers and other fixtures is a great addition to healthfulness. Such things are too costly for the ordinary householder.

The wood-fibre plumbing fixtures are neat and cleanly in appearance, light and easily handled. I have not yet had much experience in their durability.

The new copper-lined steel bath-tub is an improvement worthy of notice for houses of moderate cost.

The great gain in recent years from adopting open fixtures, tiling and doing away with woodwork in the bath-room is so well known, although of recent adoption, that it scarcely seems necessary to call attention to the fact.

PHILADELPHIA AND THE AMERICAN INSTITUTE OF ARCHITECTS.[1]

ORGANIZATION OF THE INSTITUTE.

DECEMBER 6, 1836, is a memorable date in the annals of American architecture. On that day eleven architects met at the Astor House, New York, to form an "Association for the Advancement of Architectural Science in the United States." Of those pioneers in the organization of what has since become a great national body not one remains to us. The meeting was a representative one in the best and widest sense, and the names of the attendant architects have become household words, not only as the organizers of architectural unity, but for their professional attainments and personal character. Alexander J. Davis, architect of the University of the City of New York and of many of the more prominent buildings of that day, presided. Thomas U. Walter, of Philadelphia, architect of Girard College, and later the designer of the dome and extensions of the Capitol at Washington, the second

Gateway to a Bohemian Farmhouse. From *Architektonische Rundschau.*

[1] Extracts from a paper by George C. Mason, Jr., published in the Philadelphia *Public Ledger.*

President of the reorganized Institute of Architects, and the first architect to receive, as such, the degree of LL.D. from Harvard University, was the secretary of the meeting, and issued the call which brought its members together on that day. Philadelphia also sent William Strickland, architect of the United States Custom-house, the Mint, the Exchange Building on Dock Street, and later of the Capitol of Tennessee, at Nashville. With them came John Haviland, another Philadelphia architect, an Englishman by birth, and a pupil of James Elmes, the blind architect, and author of a delightful work, the "*Life and Times of Sir Christopher Wren.*" Haviland had already made a high reputation for himself, and was the first architect to apply the radiating system to the construction of prisons, which he put in practice in his designs for the prisons at Pittsburgh and at Cherry Hill, in Philadelphia. John C. Trautwine, also of Philadelphia, architect and engineer, whose name in connection with scientific research and calculations is known all over the world, was unable to be present, but sent a letter endorsing the project. An organization was formed the following day, William Strickland presiding. This organization was formerly ratified under the title, "The American Institution of Architects," at a convention held in the old Pennsylvania Academy of Fine Arts, on Chestnut Street, Philadelphia, May 2, 1837, with a membership of twenty-three professional, two associate and twenty-five honorary members.

A comparison of dates of similar organizations with that of the Institution will be interesting. The Institute of British Architects was chartered January 11, 1837, and, by a supplemental charter, dated March 28th of the same year, had the word "Royal" prefixed to its title. There had been some informal meetings in London as far back as 1834, but 1837 is really the date of commencement of the Royal Institute of British Architects. The Architectural Association (London) was not founded until 1842, so that, among English-speaking peoples, the organization of the American Institution of Architects was well abreast of its foreign prototype.

Unfortunately, however, the Institution could not be made successful under its original plan. There could be but little cohesion in a body with a membership of only twenty-five architects, scattered all over the United States. There could be but little opportunity for meetings or mutual encouragement. The Institution practically slumbered for twenty years, and was then revived and chartered under the title of the American Institute of Architects. This reorganization was effected in the City of New York in the year 1857, with Richard Upjohn, of New York, the architect of Trinity Church and many other noted edifices, as its first President. The old Institution was never disbanded, its officers held over until their successors were appointed, and we may thus truthfully claim May 2, 1837, as the date, and the City of Philadelphia as the place of its nativity.

THE CHAPTER SYSTEM ADOPTED.

From 1857 until 1867 the Institute was simply a national body, with headquarters in New York City. In the latter year a second reorganization was effected and the chapter system inaugurated, with one Chapter — that of New York — and with national officers. The second Chapter was organized in Philadelphia, November 11, 1869. There are now 26 Chapters, scattered all over the country, with a total Institute membership of about 500, with numerous Honorary and Corresponding Members.

From the first inception of the Institution, 1836, Philadelphia architects were towers of strength to the profession, struggling to cement an organization of American architects into a society that should elevate the position of its individual members as skilful designers and well-instructed practitioners. Not only in their local Chapter, but in the broader councils of the Institute, their influence was exerted, and with the best results.

THE PHILADELPHIA CHAPTER.

The Philadelphia Chapter was organized and chartered under the laws of the Institute and of the State of Pennsylvania, November 11, 1869. It is a curious fact, that as the American Institute grew out of the old Institution of 1836, the Philadelphia Chapter was the legitimate heir of the Pennsylvania Institute of Architects, a body chartered March 4, 1861, as an entirely independent organization. The list of charter members of the Pennsylvania Institute included such well-known and honored names as John Notman, Napoleon Le Brun, John McArthur, Jr., Samuel Sloan, Edward T. Potter, James C. Sidney and Samuel D. Button, the last-named being at present the oldest practising architect in the United States. The constitution of the Pennsylvania Institute set forth an elaborate explanation of the *raison d'être* of the association: "To perfect the knowledge and elaborate the art of architecture and the sciences in connection with it. To elevate the standing of its professors by affording facilities for a free interchange of thought and a mutual agreement on the laws and rules necessary to be observed in its practice." Thus, before the Philadelphia Chapter was organized, the Pennsylvania Institute might have been said to be, in its limited field, a rival of the American Institute of Architects, the constitution of which sets forth that they are "to unite in fellowship the architects of this continent, and to combine their efforts so as to promote the artistic, scientific and practical efficiency of the profession."

The Pennsylvania Institute was short-lived, and exerted but little influence, partly from its want of scope as a parent body and partly through the troubled condition of the country, then in all the turmoil and excitement of the Civil War. Some of its strongest members left its councils and removed to other States, while others, seeing that two bodies could not well occupy the same field, urged that all influences should be exerted to strengthen the national body. Thus, in due time, out of the general reorganization of 1867, the Philadelphia Chapter came into existence. . . .

The founders of the Institution of Architects, the American Institute of Architects and the Philadelphia Chapter were strong men; they builded better than they knew, and it seems but tardy justice to gather together some recollections of those days of struggle for the encouragement of our younger students and as contribution to the history of the growth of the profession of architecture in the United States.

Among the names of the pioneers of national unity, none are more highly honored than those of Thomas U. Walter, LL.D., second President of the American Institute of Architects, and Henry A. Sims, Secretary for Foreign Correspondence. . . .

In the years immediately following the reorganization of the American Institute of Architects in 1867, Henry Augustus Sims, of Philadelphia, won high esteem in its service. He was elected to fellowship in 1869, and the next year was, as it were, at a single step, placed in the highly responsible position of Secretary of Foreign Correspondence. He at once gave evidence of his great talents and fitness for the position. At that time the Institute was young and feeble, recently organized, and almost unknown outside of the United States. At his death, in 1875, he left behind him a store of valuable documents gathered from all parts of Europe; had established affiliation with many foreign societies of influence, and made a record for usefulness, capability and industry that indicates how much time he must have withdrawn from his private interests for the benefit of his profession.

In the first year of Mr. Sims's official connection with the Institute he established communication with the following societies: The Institute of Portuguese Architects; the Architectural Institute of Scotland; the Royal Institute of Architects of Ireland; the Architects' Union of Berlin; the Architectural Union of Hamburg; the Austrian Engineers' and Architects' Union of Vienna; the Imperial Academy of St. Petersburg; the Archæological Society of Athens; the Architects' and Engineers' Union of Hanover; the Architects' and Engineers' Union of Breslau; the Central Society of Architects of Paris; the Society of Architects of the Department of the North at Lille.

In connection with the above, Mr. Sims had an extensive correspondence with individual architects and scientific men. He also formulated and distributed through Europe a concise history of the American Institute of Architects from the first organization in 1836.

The lines of communication thus opened, the advantages soon began to appear. Herr Bœkman, Vice-president of the Berlin Union, wrote that he would "gladly assist in weaving a band which should draw more closely the Berlin Union of Architects and the American Institute of Architects, and that he was sure that in saying this he was only giving expression to the Berlinese brethren in art." M. César Daly, author of the great *Revue générale d'Architecture*, wrote that he "was so favorably impressed with our system of organization, combining such perfect local liberty with such a powerful common tie, that he had warmly recommended its study to the Société Centrale des Architectes de Paris."

The next year Mr. Sims added to the list of foreign correspondents, viz: The Royal Academy of Denmark, at Copenhagen; the Society for the Propagation of Architecture in the Netherlands, at Amsterdam; the Academy of Fine Arts at Geneva.

Through these correspondents much valuable information, together with books, pamphlets, reports, etc., were received, all of which seem to have been carefully studied by Mr. Sims, and his reports were replete with quotations, comments and suggestions thereon.

In 1873, the seed thus sown began to bear fruits that were stimulating to American architecture. In a letter received that year from the Société Centrale des Architectes, there is an account of the formation of a committee "*to examine the analogy which may be made to exist between French societies of architects and our own Institute and Chapters.*" The report goes on to state that: "Previous to the year 1843, the year of the institution of our Société Centrale, there existed only the Société Academique de Lyon, but since that period societies of architects have been formed at Besançon, Troyes, Bordeaux, La Rochelle, Lille, Marseilles, Nantes, Rouen, Versailles and in other places. . . . Your committee, inspired by the forms regulating the American Institute of Architects in this matter, and which have since been followed by the Royal Institute of British Architects, has come to the conclusion that it would awaken a general interest and cement closer union among the architectural societies of France than that which now exists if we were all to unite annually in a national conference."

The above report is also valuable in that it sets forth the acceptance of the American policy by the R. I. B. A., whose charter dates from the same year as that of the A. I. A.

In 1874, although in private affliction, Mr. Sims added materially to the amount of foreign correspondence, and laid before the Convention of that year a scholarly and admirable report, drawing freely in quotation from communications received from societies in Germany, England, Russia, Sweden and Norway. He closed this,

his last report, with the following paragraph: "I think all will agree that one important function of the office I have held for several years is the procuring of such information from foreign lands. Much of such information may be so procured which can be turned to general advantage in our American architecture."

Among those pioneers in American architecture, for in those days they might truly be termed such, William Strickland should be especially remembered. I have already stated that he was the pupil of Benjamin H. Latrobe. He assisted that architect in connection with the Pennsylvania Bank. Besides the works with which his name is connected in the first part of this article, he designed the United States Naval Asylum, the United States Bank, old Masonic Hall on Chestnut Street, Chestnut Street Theatre, Arch Street Theatre, St. Stephen's Church and other works of importance. In 1825, he went to England to examine the canals and railway systems of that country, and, on his return, superintended the construction of the railroad between Newcastle and Frenchtown, Md. He was a member of the Royal Society of Civil Engineers and of the American Philosophical Society. Among his publications may be noted "*Triangulations of the Entrance into Delaware Bay*" (Philadelphia), "*Report on Canals and Railways*" (1826), and "*Public Works of the United States*" (London, 1841).

In 1844 Strickland was called to Nashville, Tenn., to design and supervise the construction of the State Capitol. This was his last work. He died April 7, 1854, and the Capitol Building was completed under the supervision of his son, F. W. Strickland. By an act of the Legislature of Tennessee, his remains were entombed in a vault sunk into the wall of the north porch of the Capitol, about four feet above the pavement. The covering slab bears the following inscription:

"William Strickland, Arch't,
Died April 7, 1854, aged 64 years.
By an Act of the Legislature of Tennessee,
His remains are deposited within this vault."

In the State Library of Tennessee is a very fine portrait of Strickland, by Cooper, and a well-modelled bust, in bronze, of the old architect is in the rooms of the Tennessee Historical Society. The bust was executed from life, by Nicholai Gevelot, in Paris.

In addition to the notice given of John Haviland as one of the originators of the Institution of 1836, it should be said that, before emigrating to the United States in 1816, he went the year previous to Russia with the intention of entering the Imperial Corps of Engineers. Among the buildings erected from his designs in this country may be enumerated the Hall of Justice, New York; United States Naval Asylum at Norfolk, Va.; the State Insane Asylum at Harrisburg, together with the State Penitentiaries of New Jersey, Missouri and Rhode Island. He was the author of "*Building Assistant*," 3 vols., 8vo, Baltimore.

The above notes on old Philadelphia architects and their services in connection with the organization of the American Institute of Architects have been drawn from authentic sources, and largely from the records of the A. I. A.

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings, plans and a full and adequate description of the buildings, including a statement of cost.*]

UNITARIAN CHURCH, BELMONT, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

[Gelatine Print, issued with the International and Imperial Editions only.]

SKETCHES MADE IN THE LATERAN MUSEUM, ROME, ITALY, BY MR. W. M. MACCAFFERTY, BROOKLYN, N. Y., *American Architect* TRAVELLING-SCHOLAR FOR 1892.

[Issued with the International and Imperial Editions only.]

DOOR OF THE PALAZZO VECCHIO, FLORENCE, ITALY. MEASURED AND DRAWN BY MR. W. M. MACCAFFERTY, BROOKLYN, N. Y., *American Architect* TRAVELLING-SCHOLAR FOR 1892.

[Issued with the International and Imperial Editions only.]

DOOR OF SAN AGOSTINO, ROME, ITALY. MEASURED AND DRAWN BY MR. W. T. PARTRIDGE, LATE ROTCH TRAVELLING-SCHOLAR.

[Issued with the International and Imperial Editions only.]

ST. ANDREW'S PRESBYTERIAN CHURCH, ST. JOHN'S, NEWFOUNDLAND. MR. J. M. MACQUEEN, ARCHITECT, HARRISBURG, PA.

THIS church is to be erected in place of the one burned down in July 1892, in the conflagration which destroyed one-half of the city. The site is a magnificent one overlooking the city, and is also large enough for the Presbyterian Academy and the Manse to be erected on, at some future date. It will be probably built of a dark blue trap rock from "south-side" quarries, with imported (cut) trimmings. The seating, of oak, is circularly arranged and will accommodate 950 persons. The roof will be an open-timber one of pitch-pine, with the bays arranged in panels, plastered and painted in distemper; the ceiling of the Lantern will be vaulted with wood ribs and plaster panels. The organ will occupy the centre at rear of chancel, the minister's and elders' seats immediately in front of organ-screen, the choir seats on each side of chancel, the pulpit on the longitudinal axis of the church just clear of the chancel-arch, with the communion-table directly in front of it. The pulpit, communion-table and chancel-screen will be of Alona Vale (West Va. Caen) stone. The probable cost will be $75,000.

MEMORIAL ORGAN FOR GRACE EPISCOPAL CHURCH, SAN FRANCISCO, CAL. MR. HENRY VAUGHAN, ARCHITECT, BOSTON, MASS.

THE new memorial organ being constructed for Grace Episcopal Church, San Francisco, Cal., will be placed in the north chancel aisle, one front facing the transept and the other the chancel. It will occupy a floor-space of 17 by 28 feet with key-desk and choir gallery in the transept. The organ-chamber has a height of 35 feet which, with the fine acoustic properties of the building, will greatly enhance the tonal effects of the instrument. The case is of quartered oak exceedingly rich in detail, with displayed pipes of burnished (proof) tin. The scheme of the organ, based upon a 32 foot tone,[1] comprises fifty-eight registers, with operating mechanism of the tubular[2] and other pneumatic systems. The tonal or artistic treatment which gives to the organ its character, will receive the highest consideration. The builders are James E. Treat & Co., of Methuen, Mass.

SKETCH FOR PROPOSED TAYLOR AVE. M. E. CHURCH, ST. LOUIS, MO. MR. A. BLAIR RIDINGTON, ST. LOUIS, MO.

THIS church was to be built with buff brick with darker brick in the pattern-work; stonework of blue Indiana stone; main roof covered with greenish-blue slate, while red tile would have been used for the tower-roof.

SEMI-DETACHED HOUSES, CHAMBERLAIN PARK, MO. MR. W. B. ITTNER, ARCHITECT, ST. LOUIS, MO.

HOUSE FOR MRS. J. W. BURROW, NORFOLK, VA. MR. J. A. WILSON, ARCHITECT, BALTIMORE, MD.

"THE PINES:" HOUSE FOR T. C. WORDIN, ESQ., BRIDGEPORT, CONN. MR. J. W. NORTHROP, ARCHITECT, BRIDGEPORT, CONN.

[Additional Illustrations in the International Edition.]

UNITARIAN CHURCH, BELMONT, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

[Heliochrome.]

HEWELL GRANGE, BROMSGROVE, ENG.: THE GRAND STAIRCASE. MESSRS. BODLEY & GARNER, ARCHITECTS.

VILLA RESIDENCES, SURBITON, ENG. MR. R. LANO PEARCE, M. S. A., ARCHITECT.

THESE villas have just been erected on one side of St. Andrew's Square, within five minutes' walk of the river, rail and the main business thoroughfare, and have the additional advantage of having a well-kept and timbered garden square, with tennis-courts, croquet lawns, etc., opposite.

The work has been well and substantially executed, and although the kitchens are on the ground-floor, the nature of the site necessitated a basement, which has been built with hollow walls, and utilized for large, dry and well-ventilated cellars. The fronts are of red bricks, natural color, rough-cast and tile-hanging, the roofs also being tiled. Clear leaded pattern glazing has been introduced in all lights above transoms, and the hall-windows and front doors, the latter, a specially artistic feature, are glazed with leaded lights of special pattern, and have the glass starred-obscure and white; in fact, color has been studiously avoided in all glazing. Each villa contains five bedrooms, one dressing-room, box, linen and cistern cupboards, bath-room and lavatory (hot and cold) two water-closets, two reception-rooms, kitchen and offices, and three cellars. The decorations and tiles, etc., for the interiors, though simple, have all

[1] The CCCC or 32 foot tone is the lowest practical pitch used in organ building and requires a pipe of this length to give the open tone. Its effect is one which is rather felt than heard, and it imparts a grandeur and dignity to the instrument which cannot be imitated. The expense of this stop approximates $500.

[2] The terms pneumatic and tubular pneumatic refer to the use of compressed air operating upon small bellows and conducted through tubes to any desired locality, by which the labor of manipulation is reduced to a minimum.

been selected with the view to an artistic and harmonious *ensemble*, a feature generally woefully ignored by builders of the speculating rank.

DESIGN FOR LOCAL BOARD OFFICES, ILFORD, ENG. W. C. BRANGWYN, ARCHITECT.

NUREMBERG, AFTER A DRAWING BY SAMUEL PROUT.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A QUESTION OF COMMISSION.

August 4, 1893.

To the Editors of the American Architect:—

Dear Sirs,—Our City Council instructed the Fire Commissioners to procure plans for an $8,000 central fire-station. We were commissioned to make plans and were given general lines of the building to follow, furnished them by their Chief of Fire-department. We told them at the time that it would cost more than they had set aside for the work, and also that we would make drawings and an estimate as they had directed. Our estimate was $13,000 and was rejected by the Council. We suggested several changes which could be made, requiring a complete new set of drawings, which was done and advertised for letting. Our actual estimate was $12,000 and the lowest bid received was $11,777. The Council rejected these plans and bids and again instructed the Commissioners to procure plans, cost of which should not exceed their price, $8,000. We were again instructed to make plans and then asked for instructions. The Commissioners declined to instruct us and called attention to what the Council had instructed them.

We again made plans, according to our own ideas which was held approved by the Fire Commissioners and Chief, and the lowest bid received on this plan was $7,775. These bids were also set aside and the Council approved the contract on the $11,777 building, thinking it was the better building for them to build, which building is completed, and we have been paid the 5% commission on the work. Now we ask a commission or reasonable compensation on plans for the cheaper priced building as the cost came within the instructions. Are we legally or equitably entitled to such commission? An early reply will oblige, Yours truly, Enquirer.

[We should say that, having faithfully followed the instructions given you were entitled to proper compensation for the extra work which you did in conformity with the Commissioners' directions, although they decided, in the end, not to make use of it.—Eds. American Architect.]

IS A PORCH A BUILDING?

Williamsport, Pa., July 24, 1893.

To the Editors of the American Architect:—

Dear Sirs,—Some time since we furnished plans for a house to be built on West Fourth Street, this city. The contract was let and the house staked off. The owner of the adjoining property gave notice that he would serve an injunction unless the house was moved back nine feet farther; in other words he set up the claim that the porch posts was the line. His deed reads that no *buildings* shall extend beyond a certain line. The question now is, is a porch a *building?* and must the extreme edges of the porch be taken as the building-line. An early reply will greatly oblige, Yours truly, R.

[Everything depends on the wording of the deed. It has been decided in a somewhat similar case, where the deed required "the main front wall" to be set twelve feet back from the street-line, that a one-st'y bay could not be built beyond the twelve-foot line, but that an open porch might be (Kirpatrick *vs.* Peshine, 9 C. E. Gr. 206). In the present case, however, the deed appears to restrict "building" generally, and it seems to us that a porch would be considered a part of the "building" to which it was attached.—Eds. American Architect.]

NOTES AND CLIPPINGS

Does the Fair owe Most to Americans or Foreigners?—Another Briton, telling his countrymen about the Chicago Fair, acknowledges that its artistic success is greater than that of any of its predecessors, and probably will not be equalled elsewhere in our time. But, he explains, the fact of this success should not excite as much surprise as it commonly does. We Americans, he says, have the great advantage of being able to draw freely for artistic aid upon England, France and Germany, while each of these countries is forced—or, at least, accustomed—to depend upon itself. And we have been wise enough to use this opportunity freely, calling in foreign "artists and artisans" to help us with our Fair. No statement could be more misleading than this. Truly, we have profited by the thews and sinews of a multitude of foreign artisans, and a good deal also by their skilful executive fingers. Probably the Fair could never have been built had we been forced to depend upon American hands to build it, as well as upon American brains to design it. It is true, furthermore, that some of the sculptured decorations of the buildings are, in design as in execution, the work of foreigners. For instance, Mr. Bitter, who decorated the Administration Building, is an Austrian, but his work is certainly not among the great triumphs of the Fair, while that of most of his German-speaking associates, shown on certain other buildings, varies from dull and commonplace to crude and bad. The best strictly architectural decorations are Mr. Martiny's on the Agricultural Building; but, although he, too, is of foreign birth, he has learned much more about his art here than he did before he came, and one can hardly look at his charming groups and figures without remembering that he has long labored under Mr. St. Gaudens's influence. Moreover, the independent works of sculpture are almost all of purely American origin—almost all, and all of the really fine ones. The most conspicuous of them we owe to Mr. French, Mr. Potter, Mr. McMonnies and Mr. Kemeys. Every prominent bit of painted decoration within and without the buildings is likewise due to American hands. All the architects of the chief buildings are Americans—Hunt, McKim, Atwood, Van Brunt, Cobb, Post, Peabody and Stearns. And who needs to be told that the three organizers of the artistic aspect of the Fair—its three creators in the widest sense—were Americans, Olmsted, Burnham and Root? Subtract the part of American artists from the Fair, and not even the ghost of a Fair would be left. Subtract the part of foreigners, and we should hardly know that anything had been taken away; or, if we realized that some items had been, we should hardly regret any of them except Mr. Martiny's contributions.—*M. G. Van Rensselaer in the New York World.*

Vagaries of Custom-house Rulings.—The recent encounter of Mr. George A. Hearn, of New York, with the Customs authorities is significant. Mr. Hearn is well known throughout the country as a collector of paintings and other works of art. He is one of the powerful group of New York merchants who have played so conspicuous a part in American collectorship. He purchased, by order, in Europe, through Mr. Charles Sedelmeyer and Messrs. Boussod, Valadon & Co., three old masters—an Isaac van Ostade, a Jan van Goyen, and a Pieter de Hooghe. When these pictures reached the New York Custom House they were denied free entry, in direct violation of the Treasury rule, for they were incontestibly painted previous to the year 1700 and, with equal certainty, part of a collection. Yet they were ruled out by the sapient official in authority on the ground, first, that three pictures did not constitute a collection, and second, that they were too large for cabinet pictures. There is no clause in the Act upon which this official and officious person based his arbitrary detention of the paintings which relates to cabinet pictures. Any one competent to fill this incompetent's place knows, in the first place, that the term of the act "Cabinets of old coins and medals and other collections of antiquities" applies strictly, in the parlance of collectorship, to numismatical and other antiquities which come under the general head of case or cabinet pieces, that is, objects which are generally preserved in cases and cabinets. The term "cabinet pictures" is applied to small works, but it is an invented term, and in fact, any picture which can be got within the space of the wall of a room is a cabinet picture. The only use of the term in common sense is to distinguish between paintings which a man can keep in his house and the vast and grandiose canvases which require a large gallery for their display. In Mr. Hearn's case, a vigorous and sensible protest to the Secretary of the Treasury secured the release of the pictures. For this every collector in America should thank him. But what can be said of a condition of officialism which puts the power to detain such works in the hands of the Naval Officer of the port? It would be just as sensible to constitute the watchman at the Seizure Room, or the janitor at the General Appraisers' Stores, a censor superior to the Collector of the Port. Indeed, it is not impossible that these subordinates have really more acquaintance with objects of art than this Captain Jenks, of the Wall street movement, to the most grimly humorous tariff under the sun.—*The Collector.*

New Process of Seasoning Canadian Lumber.—Messrs. McRae & Co., of Ottawa are developing a new industry in Canadian lumber. They have secured the control of a German patent for the treatment of beech and birch woods. Mr. McRae, speaking on the matter, said: "The great objection, hitherto held against these woods is the fact that they are very difficult to season, and even when they have been seasoned fully forty per cent is defective. By the new process the sap is sweated out of the boards by being placed, in a green state, in steam chambers for twelve days, after which it is put into the drying-chamber for two or three days, according to thickness, and then by a chemical application the wood is stained throughout a rich walnut color. The process has been tried on a large scale in Germany for the past eighteen months, and has proved such a success that experts acknowledge that wood so treated is superior to walnut and the owners there write that they are quite unable to supply the demand. No country in the world has such forests of beech and birch as Canada and the discovery of this process will no doubt greatly enhance their value. A trial kiln has been built in Ottawa and the first parcel turned out last week is so satisfactory that works for the treatment of twenty-five car-loads monthly will be erected there immediately and arrangements made for the erection of two other plants, one in Western Canada and the other in the Province of Quebec. It is probable that the bulk of the first season's output will be shipped to England, where the wood is well known and can be readily sold on a profitable basis."—*Toronto Star.*

Old Spruce valuable for Violins.—The ancient Hammond House in Marblehead, Mass., is being torn down, and some of its spruce timbers, which have been protected from rain and wind for more than 200 years, are being eagerly sought after by violin-makers for use in the manufacture of their instruments.—*New York Times.*

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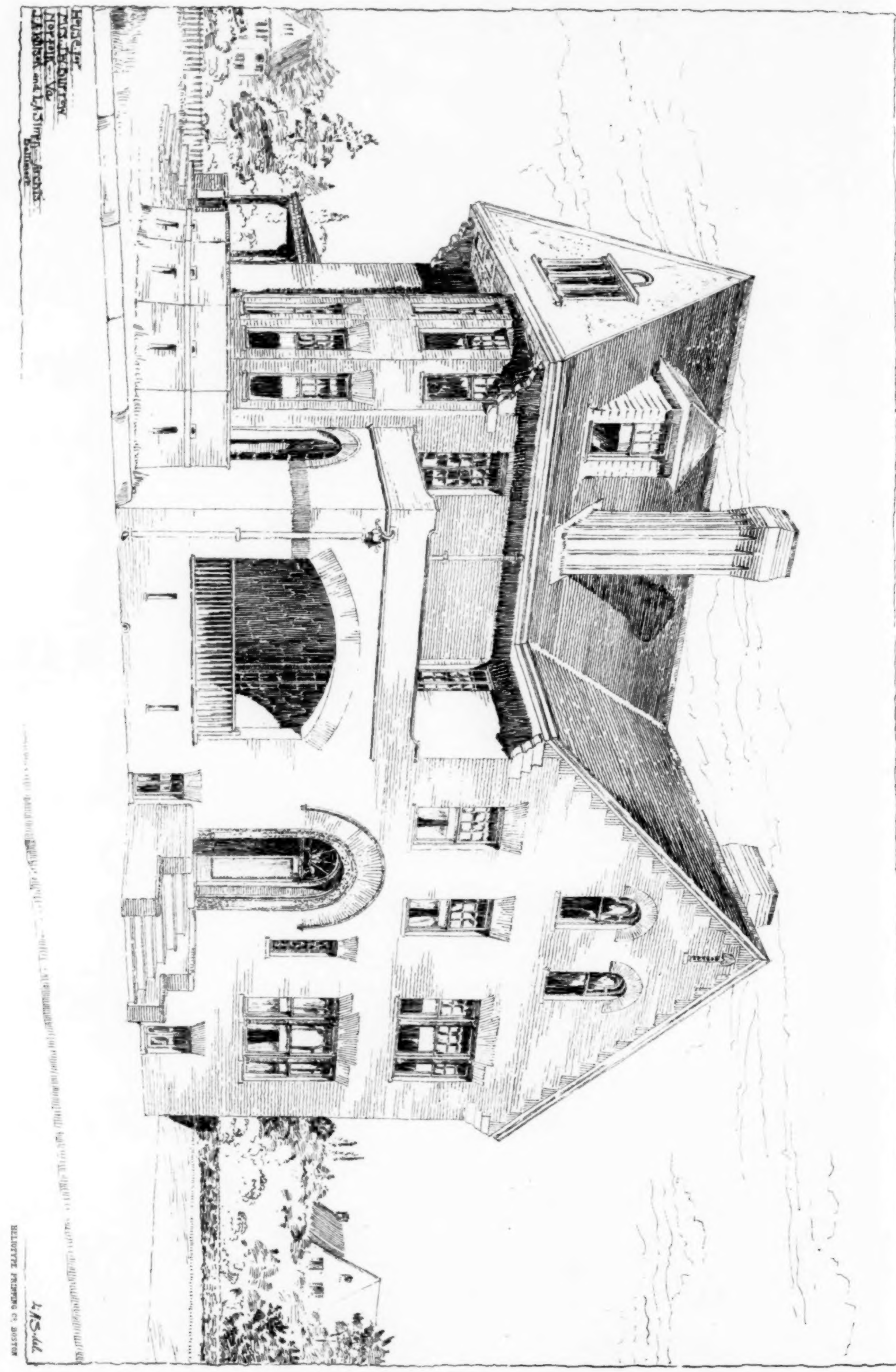

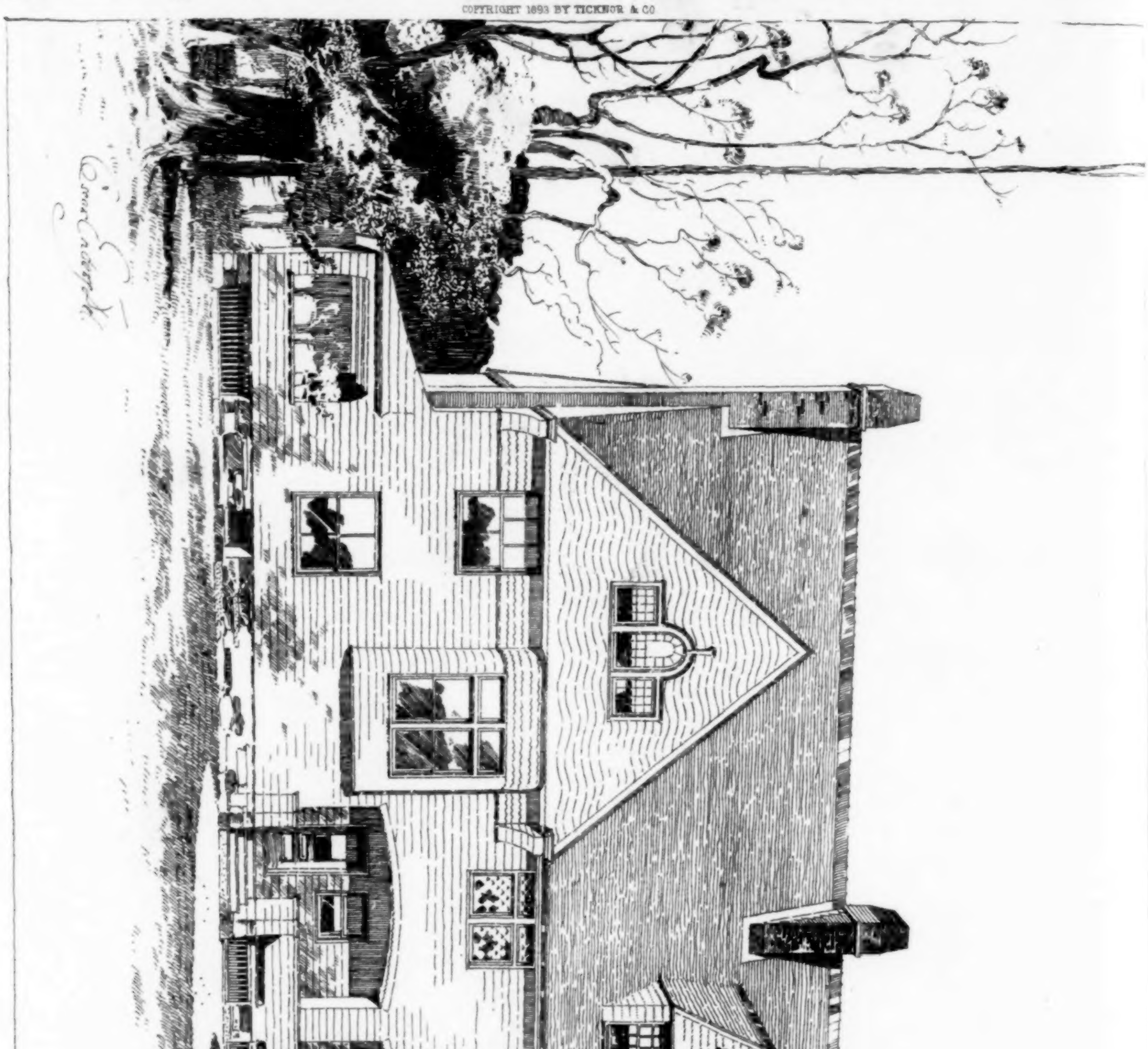
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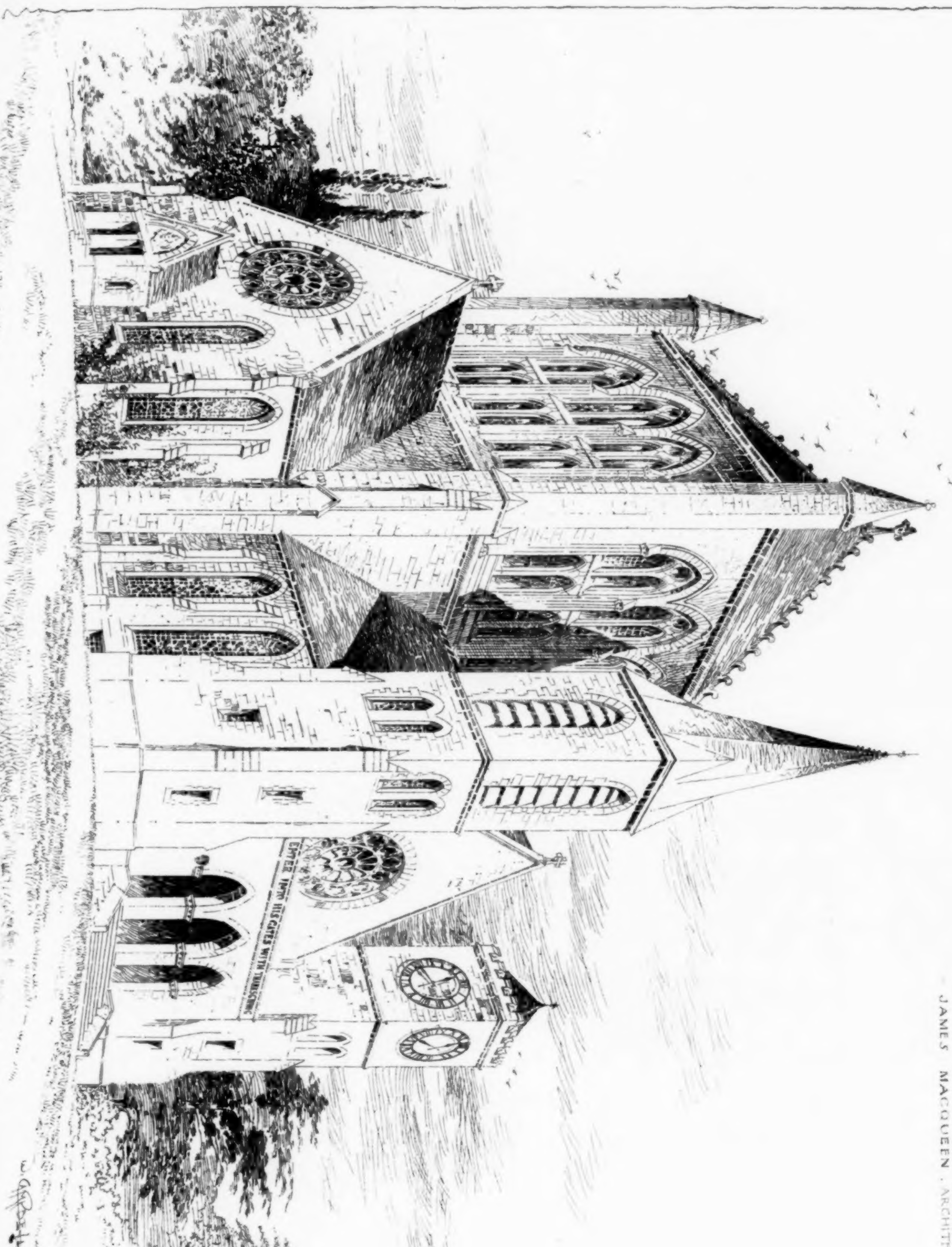

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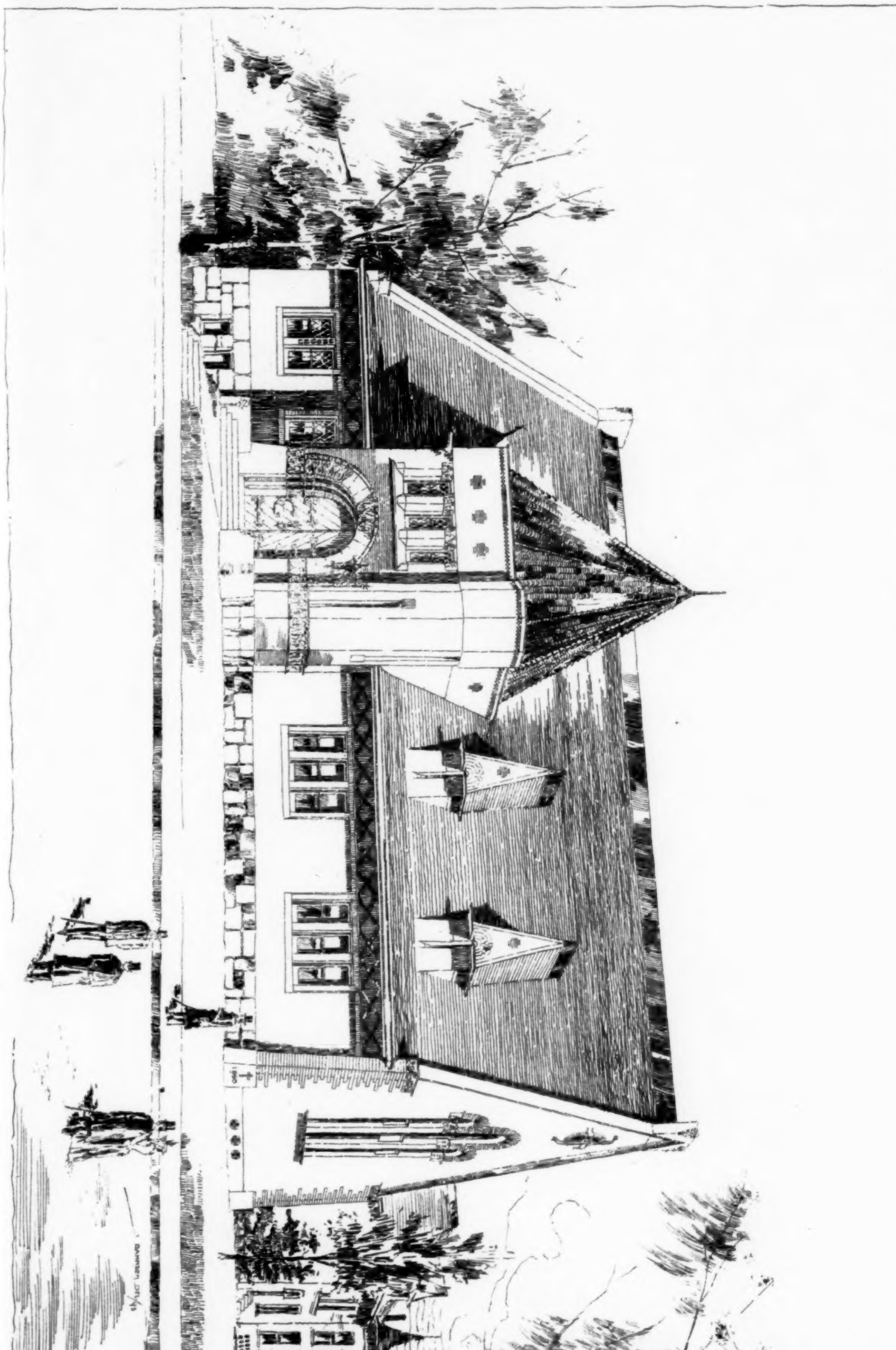

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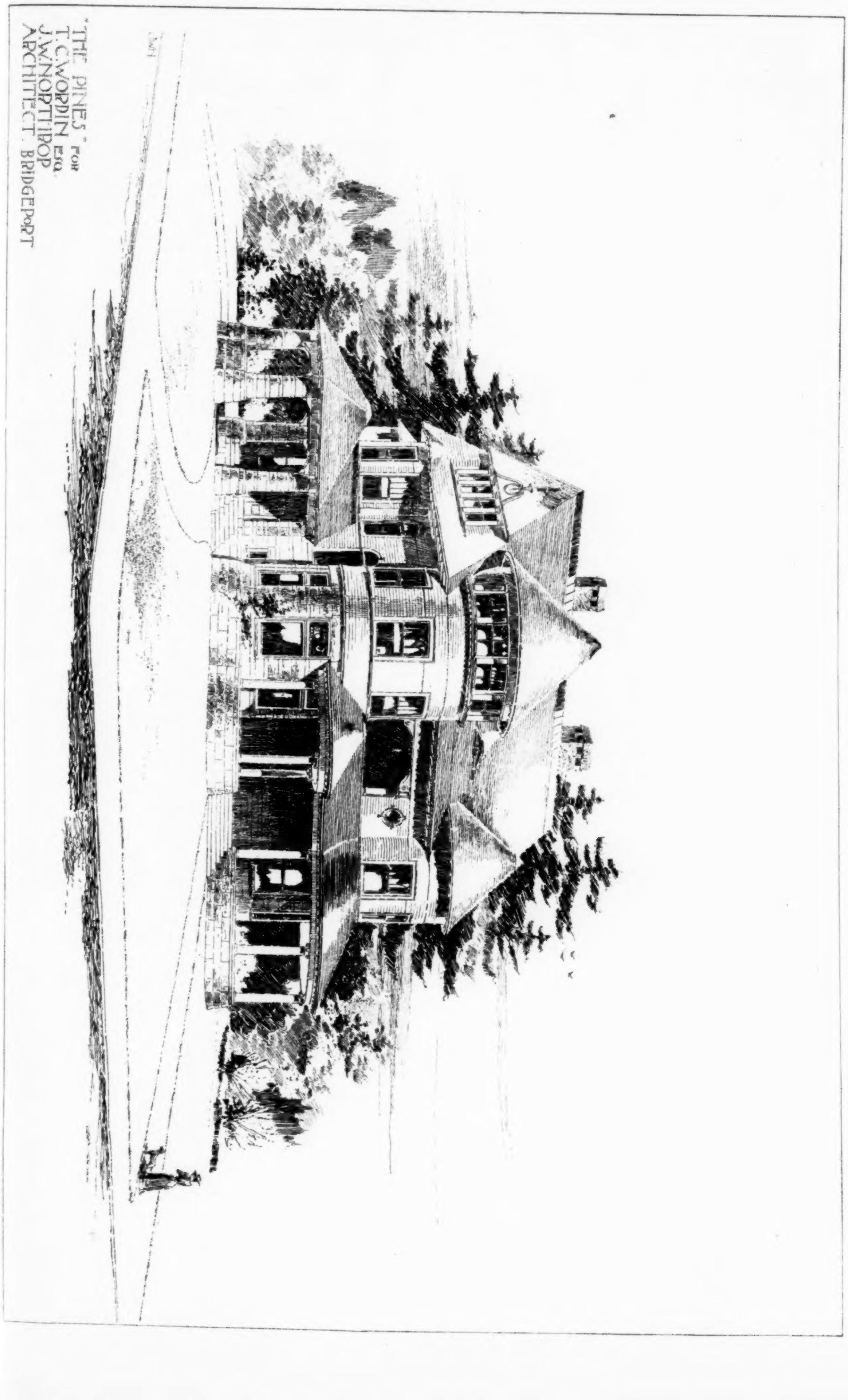

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